DOCUMENT RESUME

ED 216 206 CE 032 556

AUTHOR	Milne, Bruce G.
TITLE	Vocational Education for Gifted and Talented Students. Information Series No. 236.
INSTITUTION	Ohio State Univ., Columbus. National Center for Research in Vocational Education.
SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE	Jan 82
CONTRACT	300-78-0032
NOTE	57p.
AVAILABLE FROM	The National Center for Research in Vocational Education, National Center Publications, Box F, 1960 Kenny Rd., Columbus, OH 43210, (IN 236, $4.95; quantity discounts available--write for information).
EDRS PRICE	MF01/PC03 Plus Postage.
DESCRIPTORS	Curriculum Development; *Educational Needs; Educational Resources; Educational Trends; *Futures (of Society); *Gifted; Postsecondary Education; Program Development; *Program Improvement; Secondary Education; Student Recruitment; *Talent; *Vocational Education

ABSTRACT

The way to the future may well be through America's gifted and talented youth. High technology demands the talents of these young people. Gifted and talented students are multitalented. They have many interests and the curiosity and persistence to pursue them. Many are especially interested in technical subjects. Vocational education can offer excellent career options for these students. In order for vocational educators to contribute to the career development of gifted and talented students, they must have information that will enable them to identify these students and to develop strategies for providing them with appropriate programming. Suggestions for preparing more gifted and talented students through vocational education include the following: (1) improve the image of vocational education through public relations programs; (2) obtain training in relevant new technologies; (3) obtain information about working with gifted and talented students; (4) evaluate programs in light of the needs of gifted and talented students and assess the potential of those programs for both attracting and effectively serving such students; (5) develop differentiated programs and individualized instruction; and (6) establish a communications network to disseminate information on programs for gifted and talented students in vocational education. (Sources through which vocational educators may obtain additional resources on this topic are contained in the paper.) (KC)

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ED216206

Information Series No. 236

Vocational Education for GIFTED AND TALENTED STUDENTS

written by

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January 1982

CE032 556

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FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education, Dissemination and Utilization Function
Contract Number:	300780032
Project Number:	051MH10012
Educational Act Under Which the Funds Were Administered:	Education Amendments of 1976, P.L. 94-482
Source of Contract:	U.S. Department of Education Office of Vocational and Adult Education Washington, D.C.
Contractor:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210
Executive Director:	Robert E. Taylor
Disclaimer:	This publication was prepared pursuant to a contract with the Office of Vocational and Adult Education, U.S. Department of Education. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
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FOREWORD

Vocational Education for Gifted and Talented Students explores the contribution that vocational education can make to the lives of gifted and talented students and thereby to society. The current status of such programming is discussed along with considerations for the future.

This paper is one of seven interpretive papers produced during the fourth year of the National Center's knowledge transformation program. The review and synthesis in each topic area is intended to communicate knowledge and suggest applications. Papers in the series should be of interest to all vocational educators including teachers, administrators, federal agency personnel, researchers, and the National Center staff.

The profession is indebted to Dr. Bruce G. Milne for his scholarship in preparing this paper. Noretta Bingham of the Pennsylvania Department of Education; Dr. Richard A. Gustafson of Keene State College, Keene, New Hampshire; and Dr. Marla Peterson of the National Center for Research in Vocational Education contributed to the development of the paper through their critical review of the manuscript. Staff on the project included Alta Moser, Shelley Grieve, Raymond E. Harlan, Dr. Robert Bhaerman, Dr. Carol Kowle, Dr. Judith Samuelson, and Dr. Jay Smink. Editorial assistance was provided by Janet Kiplinger and Brenda Sessley of the Field Services staff.

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EXECUTIVE SUMMARY

The way to the future may well be through America's gifted and talented youth. High technology demands the talents of these young people. Gifted and talented students are multitalented. They have many interests and the curiosity and persistence to pursue them. Many are especially interested in technical subjects. Vocational education can offer excellent career options for these students.

In order for vocational educators to contribute to the career development of gifted and talented students, they must have information that will enable them to identify these students and to develop strategies for providing them with appropriate programming. This work reviews and synthesizes much of the pertinent information on this topic and provides sources through which vocational educators may obtain additional resources.

INTRODUCTION

This work explores the role vocational education can play in the lives of gifted and talented students. The two dimensions discussed are current programming and considerations for the future.

Although much progress has been made, there are still several areas in which further development is needed before the goal of adequate programming for gifted and talented students in vocational education is accomplished. Whereas this goal may never be completely realized, this work attempts to contribute to the progress toward it by clarifying needs and providing information and direction.

Dr. Carl J. Schaefer of Rutgers University (in Stone et al. 1976) summarizes the problem as follows:

> The forgotten student on the American education scene today is the gifted and talented student interested in vocational education. There is ample evidence to indicate that both the parents and the educators of students with outstanding abilities direct, counsel, and even force them into baccalaureate programs after completion of high school. For an estimated three to five percent of our school population, who are defined as gifted and talented, the alternative to choosing a life-satisfying career through vocational education has been denied. . . . Vocational preparation of the gifted and talented could not be more timely. (p. v)

One of education's best kept secrets is that some of the most dynamic events in education today involve gifted and talented students in vocational education. Although gifted and talented students have always been enrolled in vocational education, until recently vocational education programs for these students have not been a major goal of educators. Today, however, a new concern for meeting the educational needs of such students is emerging. Vocational education programs are proving to be a viable alternative to traditional general or academic programs for this group at both the secondary and postsecondary levels.

A major reassessment of the quantity, quality, and availability of vocational programs for gifted and talented students is underway. Concepts of giftedness are changing and vocational education programs are changing. The needs of gifted and talented students are herein reviewed in light of these changes and an attempt is made to forecast the future for these students in vocational education.

Background

Since colonial times, the public schools have dealt with many occupational issues. Whether called "learning the basics" or "advanced training," educational programs have prepared students for the world of work. The relationship between occupation and educational programs, however, became clearer around the turn of the century when the public schools began to make youth aware of the need for skilled workers in a rapidly expanding industrial society.

Before 1900, many schools attempted to provide the increasing number of secondary school students with vocational training courses, especially "manual training" for boys. By 1910, occupational preparation for youth was viewed as one solution to the social and economic problems created by industrialization. Labor leaders, social workers, industrialists, and educators were among those who provided early support for vocational education.

Vocational Education

In 1914, Congress appointed the National Aid to Vocational Education Commission to address the problem of the scarcity of skilled workers (Wirth 1966). The response of the commission, which had been charged with developing guidelines for producing the workers needed by industry, was to plan vocational education programs in isolation from other educational efforts. It is interesting to note that, despite recommendations from such noted educators as John Dewey, no educators representing the academic disciplines were appointed to the commission. According to Becker (1980), the commission wanted training for specific trades divorced from liberal education. Dewey stressed education; the commission stressed training. In 1917, however, vocational education programs became a higher priority following passage of the Smith-Hughes Act (P.L. 64-347).

Prior to World War II, vocational education was offered primarily at the secondary level. After the war, increased emphasis was placed on vocational education at the postsecondary level. At the secondary level, however, the vocational or "shop" program was not highly regarded. It was widely believed that vocational education was for students who were unable to compete in the academic track or who did not belong to racial and social majority groups (Johanningmeir 1980).

By the 1960s, vocational education critics argued that vocational programs, being too narrowly defined, had responded inadequately to economic changes. Interest in improved vocational programs resulted in federal funding that enabled various segments in occupational preparation programs to work together more effectively.

The turning point to modern vocational education centered around the passage of the Vocational Education Act of 1963 (P.L. 88-210) and the Vocational Education Amendments of 1968 (P.L. 90-576). These acts emphasized area vocational education schools and set forth provisions for secondary and postsecondary programs (Stone et al. 1976). Preparation for employment also was the focus of programs created by the Manpower Development and Training Act of 1963 (MDTA) and the Comprehensive Employment and Training Act of 1973 (CETA).

Special Education

To understand the history of gifted and talented students in vocational education, it is necessary to look at how vocational education programs have been related to special education. The present concern for gifted and talented students in such programs is directly related to the general concern for all exceptional students whose needs are not being met by regular programs.

The placement of handicapped individuals in the nation's work force was not widely practiced in the past. Churches, charitable institutions, and state-funded agencies provided whatever services were to be found for them. Programs for these persons came about as part of a general concern for individual rights.

The history of the treatment of gifted and talented individuals is not unlike that of those who were handicapped. Defined as "geniuses" or "precocious children," many gifted and talented children were provided for by churches, benefactors, mentors, or private institutions. Although they were the first "exceptional" children to receive special educational programming in the schools, gifted and talented students have received programming that has been sporadic and applied primarily to middle and upper-class males (Gearhart 1980). Many observers believe that of all the recognized exceptionalities, gifted and talented is the designation in which students are the most neglected (Gearhart 1980).

The turning point to modern special education programming occurred with the landmark legislation, The Education for All Handicapped Children Act of 1973 (P.L. 94-142), which guaranteed a free and appropriate public education to all handicapped children (Mandell and Fiscus 1981).

Gifted and talented students generally have been served outside of special education programming. Many programs that do exist for them, however, follow the guidelines established for exceptional children in P.L. 94-142, which do not apply specifically to students designated as gifted or talented. Although it is unclear whether this is a legal or moral designation, gifted and talented students generally are treated as exceptional children (Jackson 1979). According to Tannenbaum (1979) it is logical, therefore, that such students be provided with programs to accommodate their unique learning strengths.

Review of the Literature

According to Curtis, Justice, and Curtis (1980), the literature dealing with the vocational education of gifted and talented students can be grouped into four categories: (1) identification of students, (2) programming, (3) intellectual and emotional peers, and (4) career awareness (including access to vocational education). These categories fall into two broader ones: (1) methods of student identification and (2) provisions for student needs. Newland (1976) suggests the development of a third category—research on society's need for gifted and talented persons.

Although there is an abundance of literature in the topic area, it is narrowly focused on microscopic segments of the topics of identification and needs. The picture of vocational education for gifted and talented students is pieced together with difficulty because several information gaps exist. Many classroom teachers are operating without the information needed to provide adequate programming. Many of them have received only limited inservice training, perhaps of the sort Renzulli (1978) has called "macaroni macrame."

A second hiatus in the available information concerns programming relative to the techniques by which gifted and talented students are identified. Many students have been identified through broadly defined selection criteria that focus on their creativity and imagination and then placed in highly structured, convergent, and disciplined programs. Similarly, students selected because of superior intellectual and academic abilities often are placed in unstructured programs in which spontaneity, self-expression, and creativity are encouraged and rewarded. Such placements lead to frustration for both teachers and students, because they do not provide for the individual learning styles of gifted and talented students.

Some of this is due to the fact that various definitions for giftedness, such as *gifted*, *gifted and talented*, and *mentally gifted*, are not always consistently applied. In addition, some projects are designed around an *identification population*—a group selected by professionals using an approved standard—whereas others serve an *unidentified population* (officially speaking).

These "unidentified" bright students have not been identified and selected for programs, and they become frustrated when their learning is impeded by classes that do not provide for individual learning styles. These gifted and talented students often drop out of school, are expelled due to behavior problems, or submerge their identities and conform to the norm (Gourley and Richert 1978). A serious lack of information exists in the literature about this unidentified population. Who are these students? How can they be identified? How can they be helped?

There are few references in the vocational education literature concerning identified gifted and talented students. The University of South Dakota VE/GT project publications listed in Appendix A are among the few documents that focus specifically and exclusively on vocational education for gifted and talented students. These publications have provided the missing link that brings together gifted and talented students and vocational education (Ferguson 1980).

The review of vocational and career education literature points to these apparent conclusions:

- Vocational education is needed by gifted and talented high school students (Ferguson 1980; Stone et al. 1976; Woodring 1979).

- Almost all student assessments have been paper and pencil measures of cognitive abilities and achievement or performance-based evaluations of artistic and musical abilities. The fact that gifted and talented students are enrolled in and demonstrating outstanding abilities in secondary school occupational training programs, to a large extent, has been overlooked (Becker 1980; Curtis, Justice, and Curtis 1980; Wernick 1980).

- Gifted and talented students need special attention with regard to career education—counseling, early career exposure, and a variety of exploration experiences (Ford and Ellis 1979; Milne 1976).

- Vocational and career educators in the field of gifted and talented education need to strengthen their skills in identifying students, individualizing instruction, and differentiating programs (Curtis, Justice, and Curtis 1980; Ellis 1976; Ford and Ellis 1979).

- Vocational counseling for gifted and talented students has been inadequate and has not had a significant role in the career education of this group. Several writers in the field suggest that students are counseled away from vocational education (Curtis, Justice, and Curtis 1980; Ellis 1979; Ferguson 1980; Milne 1979).

Additional information about vocational education and gifted and talented students is provided in Appendix A.

Integration of Educational Programs

Appropriate programming for gifted and talented students can be designed by selecting from all available course options. Educators in both general and vocational education must cooperate to provide appropriate programs for all secondary and postsecondary students, but especially those who are gifted or talented. Data exist to support the need for an appropriate educational balance.

A significant change has occurred in the public view of secondary education. Whereas it previously has been seen as primarily preparation for college, it is now coming to be viewed as preparation for life. We are becoming more concerned about providing that which is best for individuals in their efforts to prepare for a lifetime career.

Too many talented or academically gifted youth from lower socioeconomic backgrounds (including those with potential in scientific and technical areas) fail to continue their education after high school or even after fulfilling the minimum compulsory attendance requirements (Sewell 1981). In many cases, this is due to a lack of salable skills that could have been obtained in high school and used to support these students through further education. These students' talents are lost to society due to failure to provide them with balanced educational programs.

Vocational teachers defend their programs and demand more support for them, whereas general education teachers defend their disciplines with similar vigor (Woodring 1979). This results from the fact that teachers are more likely to defend the educational programs that placed them in their careers. They sometimes overlook the fact that students today need to have some preparation in both general and vocational education.

Although many students, including a number of gifted and talented students, are enrolled in vocational education, much of the public views participation in both general and vocational education programs as incompatible. Certain academic courses are prerequisites for vocational education programs, necessitating an integration of general and vocational programs (Sewell 1981). The public, obviously, must become better informed about vocational education programs. This will help bring about the needed attitude changes. The *National Advisory Council on Vocational Education First Annual Report* (1969) describes the problem in these terms:

> At the very heart of our problem is a national attitude that says vocational education is designed for somebody else's children. This attitude is shared by businessmen, labor leaders, administrators, teachers, parents and students. We are all guilty. We have promoted the idea that the only good education is an education capped by four years of college. (pp. 1-2)

The emerging view of education as preparation for life (rather than for college) may be a significant factor in modifying this attitude.

Unfortunately, vocational education has, in many instances, been developed as a separate educational program. Today this structure is perpetuated by many school systems where vocational education programs are housed in separate buildings (often at separate locations) and are separately administered. Often minimal coordination with comprehensive secondary school programs occurs. Becker (1980) warns that this separation may indicate that vocational education programs may be falling short of genuine education. Some related warning signs may be as follows:

- Counselors referring to vocational education as a terminal program
- Bright students not enrolling in vocational education programs
- Master schedules arranged so that general and vocational education courses conflict

Ferguson (1980) reports the following as reasons why gifted and talented high school students do not enroll in vocational education programs:

- Lack of time
- Lack of interest
- Lack of staff training and time
- Adult influence
- Insufficient funds
- Lack of teamwork between general and vocational education staffs
- A wide variety of course options
- Vocational education classes that are not sufficiently challenging (or individualized)

The provision of balanced educational programming for gifted and talented students necessitates attitude changes on the part of both educators and the public. The integration of general and vocational education programs can facilitate the delivery of such balanced programming. Planning for future programs should provide for this concern.

Vocational Education for Gifted and Talented Students

The definition of vocational education taken from the vocational education section (Title II) of the Education Amendments of 1976 (P.L. 94-482) reads as follows:

> The term "vocational education" means organized education programs which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree; and, for purposes of this paragraph, the term "organized education program" means only (A) instruction related to the occupation or occupations for which the students are in training or instruction necessary for students to benefit from such training, and, (B) the acquisition, maintenance, and repair of instructional supplies, teaching aids and equipment; and the term "vocational education" does not mean the construction, acquisition or initial equipment of buildings, or the acquisition or rental of land.

Many educators who work with gifted and talented students think that the phrase "other than a baccalaureate or advanced degree" too narrowly defines vocational education. Others consider the terms "unpaid employment" and "instruction necessary for students to benefit from such training" as defining it too broadly.* In spite of these concerns, this definition currently defines the parameters of programs within which vocational educators and gifted and talented students interact.

These programs are structured around a variety of purposes. Evans (1981) relates that six types of vocational education programs result. These are the following: *job*-specific training, *occupationally*-specific education, occupational *area* preparation, *employability* preparation, *prevocational guidance*, and *prevocational basic education*. Evans emphasizes that all who enroll

*Letter from W. J. Anderson, Arizona Department of Education, July 21, 1977.

have a common goal, acquiring salable skills that lead to satisfying and meaningful careers, whichever type of program they choose. This variety provides a wide range of choices in programming for gifted and talented students.

Today, the emphasis in education is on students as individuals, regardless of their ability level or potential. Changes have occurred in the focus of the content, special skills, types of learners encountered, and learning environment (Gallagher 1979). Gifted and talented students, therefore, must be considered in the context of a pluralistic nation whose goal is to provide equal educational opportunities for all citizens.

Tannenbaum (1979) indicates that the five years following the launch of the first Russian satellite in 1957 and the last five years of the 1970s may be viewed as peak periods of interest in gifted and talented children. In 1957, public indifference toward the lack of American scientists and technologists changed to a commitment to quickly training new ones. Providing enriched educational programs for gifted and talented children was seen as one means for accomplishing this.

References to the late 1960s and 1970s are common in the literature on gifted and talented students. During this period, a change of focus and increase in programmatic development paralleled the changes that occurred in vocational education. Advocacy on behalf of gifted and talented students resulted, in part, from the restlessness of the 1960s and as part of the advocacy for those with marked individual differences (Sellin and Birch 1980). In 1970, section 806, "Provisions Related to Gifted and Talented Children," was added to the Elementary and Secondary Education Amendments of 1969 (P.L. 91-230) (Tannenbaum 1979).

The effort to increase attention to gifted and talented students that resulted in this legislation came from several sources, including a report prepared for Congress by Sidney Marland, who then was serving as the United States commissioner of education. The report indicated that only about 4 percent of the 1.5 to 2.5 million gifted and talented children estimated to be enrolled in the schools were being served by existing programs (Passow and Tannenbaum 1976). It also showed that those gifted and talented students who received satisfactory attention at school were concentrated in only ten of the fifty states (Tannenbaum 1979).

Tremendous strides have been made in remedying the situation that prompted the 1970 legislation. Teams of educators throughout the country participated in the National/State Leadership Training Institute program. Leaders in state education departments, having received information about identifying and planning programs for gifted and talented students, developed state plans. By 1979, there was some degree of educational programming available for gifted and talented students in each state (Jackson 1979).

The VE/GT Project

One of the projects developed during the second period of concern (1975-1980) for gifted and talented students was the Vocational Education/Gifted and Talented (VE/GT) project at the University of South Dakota. Project staff developed materials for vocational and other educators under the sponsorship of the Bureau of Occupational and Adult Education, U.S. Office of Education. The publications create an awareness of the opportunities in secondary and postsecondary vocational programs for gifted and talented students.

A team of educators from each state and territory attended a VE/GT conference and was then required to develop a state (or territory) plan for programming of gifted and talented students in vocational education.

In 1977 more than 300 vocational educators, educators of gifted and talented students, and guidance counselors attended a series of five conferences. They considered a set of assumptions, which were advanced as the bases for interaction, and governed by the following conceptual rules:

- The top 2 to 3 percent of students were to be considered gifted or talented, rather all than above-average students.
- The focus was to be on vocational preparation of gifted and talented students through vocational education.
- The focus was to be on educators—vocational and guidance counselors and specialists for gifted and talented students.
- The focus was to be on potentials, not knowns.
- The focus was to be on providing practical experiences for, not on teaching, gifted and talented students.

In order to involve gifted and talented students in vocational education programs, it was proposed that educators must subscribe to the fundamental principles underlying each of the following assumptions:

- There are a vast number of identified and potentially identifiable gifted and talented students who are not being appropriately educated in regular school programs, general or vocational.
- Although there are many existing, relatively well-defined programs in vocational education that are appropriate for gifted and talented students, they are not aware of them (and consequently are not enrolling in them).
- The guidance and counseling programs in most schools are not providing adequate career or vocational guidance, particularly for gifted and talented students.
- Traditional educational programs do not provide individualization suitable for gifted and talented students.
- The public is critical of the quality of the products of our educational programs and is demanding better educated and more responsible graduates.
- Although many educators espouse the need for individualization, they are failing to apply this concept.
- Although many dollars have gone to schools to meet the practical needs of students, most of this money has been used in the development, dissemination, and evaluation of theory.
- Education, in general, is reactive, rather than proactive.
- There are sufficient data, models, programs, materials, and effective educators to attract gifted and talented students to vocational education. What is lacking is a commitment to change among educators.

- Educators, particularly vocational educators, guidance counselors, and administrators, are responsible for changing present practices.

An evaluation has documented that change did result from the state plans developed at the VE/GT conferences. Some examples of activities that have been documented are the following:

- *Vermont*—A resource on gifted and talented students in vocational education was developed through the support of the Research Coordinating Unit of the Vermont Department of Education, Division of Vocational-Technical Education (Gustafson and Laferts 1978).

- *California*—Ceres Unified School District developed a booklet designed to improve vocational guidance programs for gifted and talented students. Information is provided on the role of the counselor who works with gifted and talented students and with identifying and programming these individuals (Ferguson 1980).

The many requests for information about the VE/GT project that have been received by project personnel at the University of South Dakota suggest that the materials developed for the project have been disseminated widely. Perhaps the increased awareness that has resulted will lead to more appropriate vocational education programming for gifted and talented students.

APPROPRIATE PROGRAMS

Whereas some progress has been made toward the goal of providing appropriate programming for gifted and talented students in vocational education a number of concerns remain. For example, educators are not yet operating under the broadened definition of "giftedness" adopted in 1970 (Gallagher 1979). This definition is part of section 806 (Provisions Related to Gifted and Talented Children) which was added in 1970 to the Elementary and Secondary Education Amendments of 1969 (P.L. 91-230).

Definition and Identification

Definitions of Gifted and Talented

No single definition for the term *gifted and talented* is found in the literature. At least two schools of thought about giftedness exist. The classic school of thought defines giftedness solely on the basis of superior intellect. A more contemporary position recognizes a broader range of gifts and talents in defining giftedness. In the newer definition, superior intellectual ability is recognized as one of several abilities. This view is reflected in the federal guidelines of 1970 (P.L. 91-230). Between these two positions, a spectrum of other definitions reflects the various attitudes, values, and interests of individuals and groups using the definition (leadership, skill in performing arts and athletics, creativity, and so forth).

Nearly all definitions of the term *gifted*, prior to 1950, either explicitly or implicitly refer to superior intellectual ability. The word *talent* originally came into use primarily in relation to academic talent. The term *creativity* began to appear in the 1950s and has been a widely accepted indicator in defining gifted and talented students (Gearhart 1980).

The 1976 federal definition appears to be quite sufficient for most purposes:

> "Gifted and talented" means children and where applicable, youth, who are identified at the preschool, elementary, or secondary level as (1) possessing demonstrated or potential abilities that give evidence of high performance capability in areas such as intellectual, creative, specific academic, or leadership ability or in the performing and visual arts; and (2) needing differentiated education or services (beyond those being provided by the regular school system to the average student) in order to realize these potentialities. (*Federal Register*, 6 May 1976, p. 18666)

As this definition implies, the abilities of gifted and talented individuals encompass a wide array of areas. However, the numbers of gifted and talented students in any one school, district, or vocational center will seldom warrant the provision of a separate program for them (Stone et al. 1976).

The 1976 definition suggests that educators should individualize programs to accommodate gifted and talented students in all program areas. Some programs in vocational education have

been individualized to meet the needs of high-achieving gifted and talented students. In defining gifted and talented in order to determine eligibility for these programs, the inclusion of additional characteristics in the definition becomes necessary. Concerns for creativity, productivity, and high levels of motor-skill ability should be part of the definition when programs utilizing such traits are available (Delisle 1981).

Identification

Although a number of procedures have been developed for identifying gifted and talented students, further research and development must accompany changing definitions of the term *giftedness* and improved identification and understanding of individual learning styles.

The most frequently used identification strategies have been categorized by Milne (1976) as the following:

- Checklists (also checklists with rating scales)
- Observations (often accompanied by some scaling technique)
- Standardized tests
- Referrals (with or without checklists)
- Case studies (after student referrals)
- Interviews

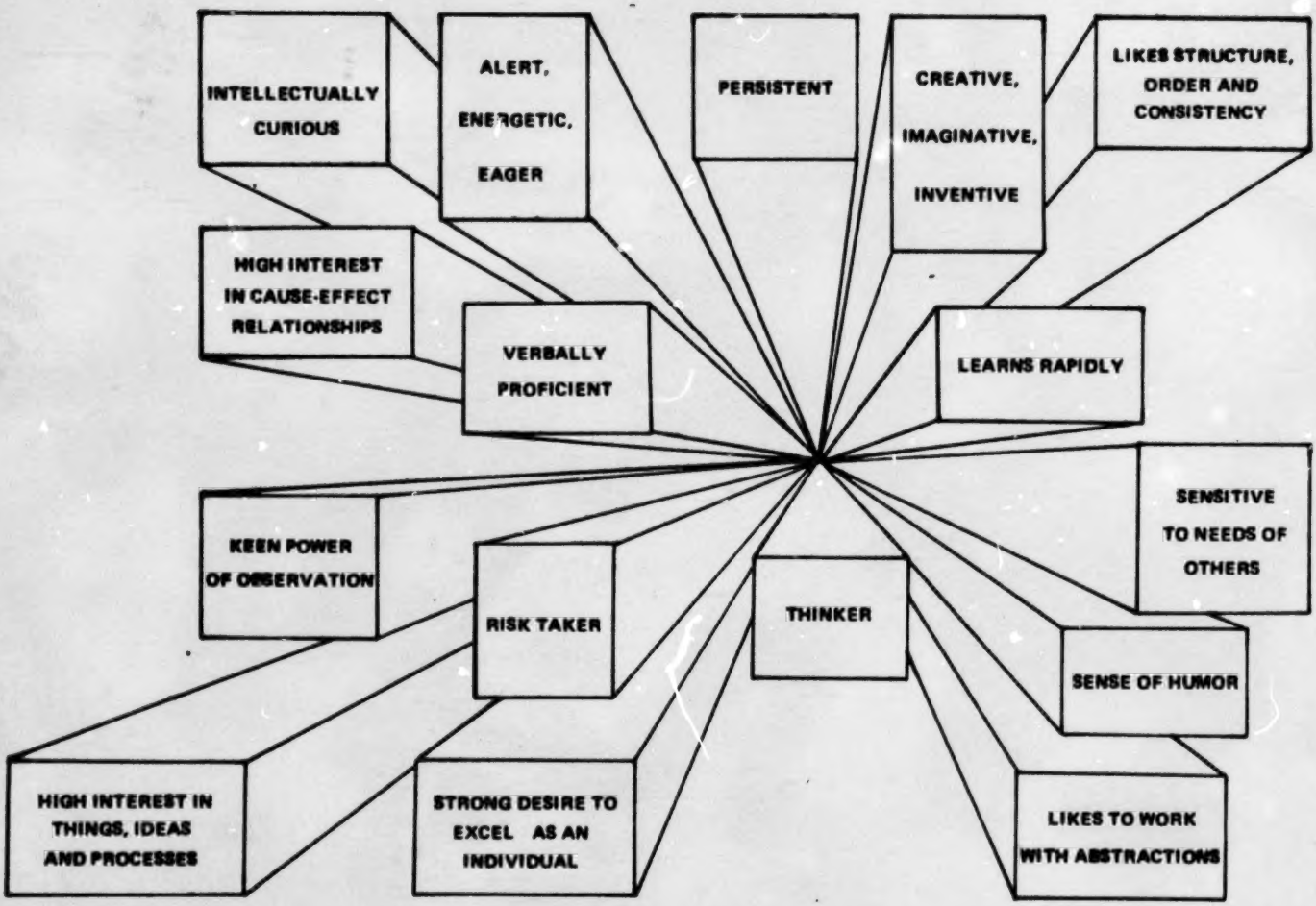
Figure 1 illustrates some commonly observed characteristics of gifted and talented students. Although no single student possesses all of these traits, the characteristics shown are among those most frequently cited on checklists and rating scales. Training and experience in the identification of gifted and talented students through observations and appraisals will assist vocational educators in identifying gifted and talented students.

Characteristics of gifted and talented students that may be identified through observations and appraisals are the following (Martinson 1974):

- Powers of concentration
- Independent thinking
- Versatile use of mental processes
- Perseverance in intellectual endeavors
- Desire to learn
- Mastery of basic skills
- Excellent command of language, precocity in using words and sentences
- Creative imagination and resourcefulness

FIGURE 1

CHARACTERISTICS OF GIFTED AND TALENTED STUDENTS



SOURCE: Milne and Lindekugel 1976.

- Alertness and great responsiveness; great sensitivity to various objects in the immediate environment
- Ability to organize information
- Varied interests
- Curiosity
- Grasp of abstract generalizations
- Insight
- Retention
- Extreme rapidity in learning and remembering
- Unusual ability
- Ability to recount accurately the correct sequence of happenings during an excursion or event
- Cooperativeness
- Participation in school activities
- Leadership

In light of the cultural, environmental, and socioeconomic factors that are generally supposed to affect standardized test results, the use of checklists in addition to such tests is recommended. The use of commonly observed traits as the basis for identification ensures that gifted and talented students are more likely to be selected for programs (Milne and Lindekugel 1976).

Over the years, the effort to identify gifted and talented children has been predicated on the desire to place them in special programs to prepare them for leadership roles and to assist them in fulfilling their potential (Whitmore 1980). Educators who initiate the development of programs for gifted and talented students should, therefore, consider the availability of programs for students before beginning the identification process.

Recent concerns over labeling students as gifted and talented have caused students and their parents to question the value of identification processes when no suitable programs are available. When programs are available, it is important that students be identified as early as possible. It is thought that identification should occur between the fifth and eighth grades, so that schools can develop appropriate secondary and postsecondary programs (Fox 1980).

Identifying gifted and talented students must be accomplished in the light of recent research that suggests that giftedness is an interaction among the following three general categories of traits (Renzulli 1978):

- Above-average general abilities

- High levels of task commitment
- High levels of creativity

Being gifted does not make students better, but it does make them different, and that difference needs special attention (Holstein 1981).

Individualization and Differentiation of Programs

The development of individualized and differentiated instruction in both general and vocational education for gifted and talented students is a major challenge for educators. Today's highly technological economic system demands equally highly skilled workers. Many of the young people entering the work force in the United States today lack even the most basic skills. Secondary and postsecondary schools have developed remedial education programs in response to the needs of these young people.

Individualization

From these experimental efforts, educators have learned that solutions lie more in changes in instructional methodology than in content (Milne 1979). Such changes in methodology are known as individualization of instruction—instruction that provides for individual learning styles.

Renzulli (1978) suggests a "revolving-door model" that allows gifted and talented students to move in and out of special programs, thereby providing for their individual learning styles and making those programs available to greater numbers of students. Students receive experience-based program assignments for a designated period of time. At the end of that time, other students are assigned to the program. This approach has apparent potential for individualizing programs for gifted and talented students in vocational education.

Another accepted means of providing for the individual learning styles of gifted and talented students has been called *relevant enrichment*. This method has been used widely and successfully. Gifted and talented students are often enrolled in vocational education programs in addition to academic courses for enrichment.

Acceleration has also long been used to provide for the individual learning styles of gifted and talented students. This approach shortens the number of years gifted and talented students spend in school. The purpose of acceleration is to move them rapidly to the end of their apprenticeship and launch them into careers (Gallagher 1975).

Research dealing with individual learning styles is based on the premise that individuals learn differently, establishing their own unique style, probably at an early age. Knowing about these differences suggests to the practitioner the most appropriate instructional approach (Hunt 1981). In order to meet individual needs, teachers assess the learner's style, e.g., modality, tempo, and problem-solving strategy (Sperry 1972). After assessment, the teacher attempts to instruct students according to their individual learning styles.

The most basic need related to learning is to continue to address the question of how to learn how to learn (Sellin and Birch 1980). As we consider the learning styles of gifted and talented students, some questions that arise are the following:

- Why do gifted and talented students learn at an earlier age?
- How do gifted and talented students learn?
- Why do gifted and talented students learn more easily?
- What does the statement "they may learn differently" imply?

Learning Styles

Bloom (1976) lists three important elements that affect learning, (1) student characteristics, (2) instructional procedures, and (3) learning outcomes. He suggests that students' prior learning, motivation, and perception of the appropriateness of the instruction heavily influence their learning. The literature supports the notion that attitudes (affective factors) are a determinate of motivation. The learner's attention, emotions, and values make learning either a personal or an impersonal experience (Keefe 1979).

Student learning characteristics center around the conditions that Dunn and Dunn (1978) have called the elements of learning style. These elements are environmental, emotional, sociological, and physical.

Environmental. Stimuli in this category are related to sound, light, temperature, and design (of the room).

Emotional. These stimuli include such characteristics as motivation, persistence, responsibility, and structure (schedules, assignments, and so forth).

Sociological. Students' preferences for learning with peers, by themselves, or with adults are learning stimuli of the sociological category.

Physical. This element of learning style includes stimuli such as perceptual (visual, auditory, and kinesthetic), intake (nourishment), time, and relative need for mobility.

The learning styles of gifted and talented students are elaborated on by Griggs and Price (1979). The relationship of these characteristics to the work by Dunn and Dunn is apparent. Griggs and Price list the following characteristics of gifted and talented students. Each element described by Dunn and Dunn is noted in parentheses. Gifted and talented students:

- are less teacher motivated than other students (Emotional)
- are more persistent than other students (Emotional)
- are more self-directed and independent than other students (Emotional)
- like some sound in their learning environment when studying or concentrating (Environmental)
- do not like to learn from lectures, e.g., auditorially (Physical)

It is apparent from the work of Griggs and Price that gifted and talented students' learning style characteristics are largely related to the emotional element—centering around motivation and persistence.

Traditional instructional methods such as large group lectures, demonstrations, and discussions have been subject to question for some time. Even with the addition of small group activities and audiovisual presentations, traditional instruction is a group process that essentially does not provide for learning styles.

Barbe and Swassing (1979) elaborate on the *perceptual* dimension of learner styles noted by Dunn and Dunn through consideration of students' primary learning modalities or modality strengths—visual, auditory, and kinesthetic. Vocational educators have traditionally attended to individual learning styles through using a variety of activities that provide for visual, auditory, and kinesthetic modality strengths—perhaps more so than those in academic areas who rely more on lectures, the chalk board, and paperwork.

In addition to the *perceptual* dimension, research on learning styles also is concerned with the *processing* systems that people use to organize ideas. *Relational Thinking Styles* (RTS) is the model developed by Davis and Schwimmer (1980), who see learners as using (1) digital (sequential), (2) multidigital, (3) multirelational, (4) transient, and (5) metarelational thinking styles. These, they suggest, are unrelated to intellectual ability.

The applications of the work of Davis and Schwimmer to vocational education are both interesting and important. Characteristic thinking styles apparently correspond to certain occupations and roles. The RTS styles (meta-relational thinkers are able to use any of the four other styles) and some sample occupational relationships are as follows (Davis and Schwimmer 1980).

- *Digital*—(1) low digital, repetitive tasks (minute to minute) at a consistent pace; factory and clerical workers, (2) basic digital, repetitive work (day to day), structured procedures; teachers, nurses, electricians, plumbers, and repair workers

- *Multidigital*—complex planning, choosing and sequencing tasks; researchers, managers, counselors, mechanics

- *Multirelational*—manipulative activities of own choosing; writers, dancers, musicians, real estate salespersons, entrepreneurs

- *Transient*—nonrepetitive, nondetailed assignments that provide freedom and little supervision; actors/actresses, retail salespersons

Kolb (1981) identifies two dimensions of learning: (1) concrete to abstract and (2) reflective to active. He suggests that these dimensions interact to yield the following four types of learners (who display the characteristics listed):

- *Divergers* tend to be interested in *people* and are, therefore, attracted to the humanities and liberal arts.

- *Assimilators* are systematic and goal oriented and, therefore, interested in theory, but not in its applications. They often become scientists—physicists and chemists.

- *Convergers* look for a single answer. They are interested in things and, therefore, often are drawn to engineering.

- *Accommodators* are trial and error thinkers. They often choose technical or practical occupations. Many accommodators tend to be educators.

The potential applications of Kolb's theories to both vocational education and to gifted and talented students are apparent. Gregorc and Ward (1977) identify dimensions somewhat similar to Kolb's, using the concrete to abstract dimension, but relating it to process styles from random to sequential. The four types of learners produced in the interaction of these dimensions are as follows:

- *Concrete sequential thinkers*—accept authority, are cognitively based, step-by-step thinkers, and see discrete parts.
- *Abstract random thinkers*—see things as wholes, tend to be affective, multisensory, and subjective.
- *Concrete random thinkers*—are cognitively and affectively based, have a problem-solving orientation, and follow only limited structure and authority.
- *Abstract sequential thinkers*—are analytically, cognitively based, have a low tolerance for distraction, anticipate excellence, and are evaluative.

Differentiation

The implications of learning styles theory for vocational education offer exciting possibilities for gifted and talented students. Just as research into learning styles justifies individualization of instruction, a practice widely utilized in vocational education, this research provides a rationale for differentiated programming, an essential component of programs for gifted and talented students.

Learning styles research focuses on a neglected aspect of learning—individual differences. This is critical to the effective instruction of gifted and talented students who lose interest in school when they are forced to work with a group whose learning style is different, usually slower, than their own.

Pacing is an obvious justification for individualization, because it enables students to pursue their individual interests and to complete assignments at their own rate (Morris and Pai 1976). Further, pacing to provide for individual differences includes differentiation of programming. Although individualization provides for the individual learning styles of gifted and talented students by varying the methodology of instruction, differentiation provides for those needs through varying content. Through differentiation of programming, content not found in the regular vocational education curriculum is added to the learning experiences of gifted and talented students to provide for their interests and needs and to enhance their employability.

Kaplan (1974) describes differentiated programming as involving the use of novel procedures for presenting learning opportunities. The three variables in programming that may be manipulated are as follows:

- Exposure—information, materials, and experiences are provided that are new; outside of the usual curriculum; and unusual for the students' grades and ages
- Extension—additional time is provided for investigation of an area of interest, including time for student-related activities

- Development--more indepth investigation of concepts and skills presented in the regular curriculum is encouraged

Passow (1979) notes that programs for gifted and talented students need to provide a balance between independent activities and interaction with resources, both in and out of school. One often overlooked consideration in *differentiating* learning programs for gifted and talented students is that school may or may not be the best place for them to learn. Community resources may offer richer learning experiences. Such environments extend learning far beyond the classroom (Smith 1981).

Vocational educators need to be aware of learning style research and understand the learning styles of gifted and talented students if they are to be effective in working with these students. Additional information about learning styles theories and instruments for assessing individual's learning styles may be obtained from the sources listed in Appendix B. Figures 2 and 3 illustrate directions that should be considered for *individualized* and *differentiated* instruction and for providing a program enrichment model.

Teaching Styles

Modification of instruction for gifted and talented students is ultimately the responsibility of classroom teachers. Vocational education teachers might wonder, as nearly all teachers do, whether or not they are qualified to work with these students. However, a vocational education teacher clearly has much to offer to gifted and talented students by virtue of both training and experience.

Torrance (1965) notes that knowledge, techniques, and procedures must be combined with the teacher's own potentialities and the needs of students in such a way as to create a unique teaching style. This unique teaching style is important to helping gifted and talented students discover and develop their unique potentialities. Gifted and talented students are virtually always multitalented persons who possess many interests and the ability to develop them. Teachers need to analyze proposed digressions from standard curricula and encourage those that are potentially advantageous to students' career goals (Stone et al. 1976).

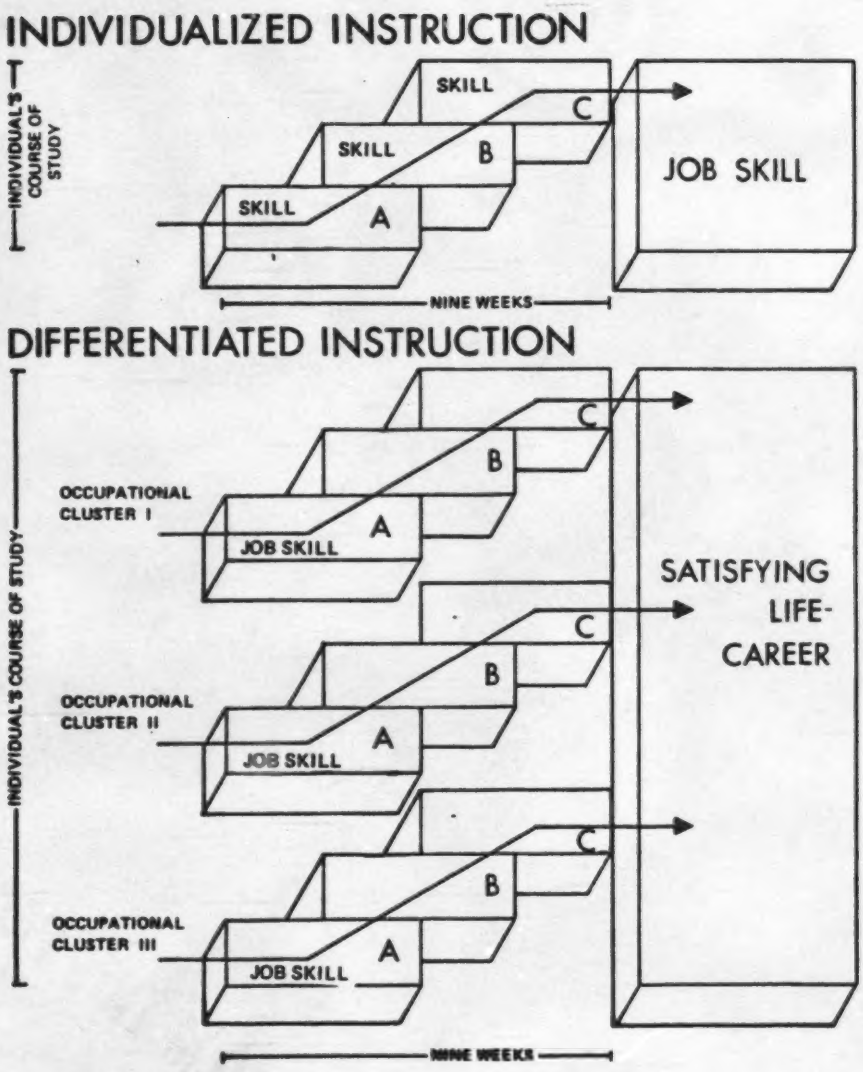
Research has been conducted on such questions as who should teach gifted and talented students and what preparations are needed for teaching these students. Gowan (1971) suggests that teacher preparation should include courses in (1) the pyschology and education of gifted and talented learners, (2) methods and materials for gifted and talented students, and (3) supervised practice teaching. Sellin and Birch (1980) recommend intensive inservice training under expert consultants or inservice minicourses presented by teachers, counselors, or administrators.

Gallagher (1975) points out that a review of the desirable characteristics for teachers of gifted and talented students produces a list of traits all of which no educator could possibly acquire. He concludes, however, that a successful teacher of gifted and talented students is mature, experienced, and has a superior intellect. Renzulli and Callahan (1978) also note the importance of intelligence and experience for such teachers.

Sellin and Birch (1980), on the other hand, cite such humanistic factors as (1) caring about the gifted student as a whole person, (2) treating the student more as a peer than as a subordinate, (3) providing more freedom (less structure) for gifted and talented students, and (4) being willing to accommodate students' interests and aspirations rather than focusing solely on

FIGURE 2

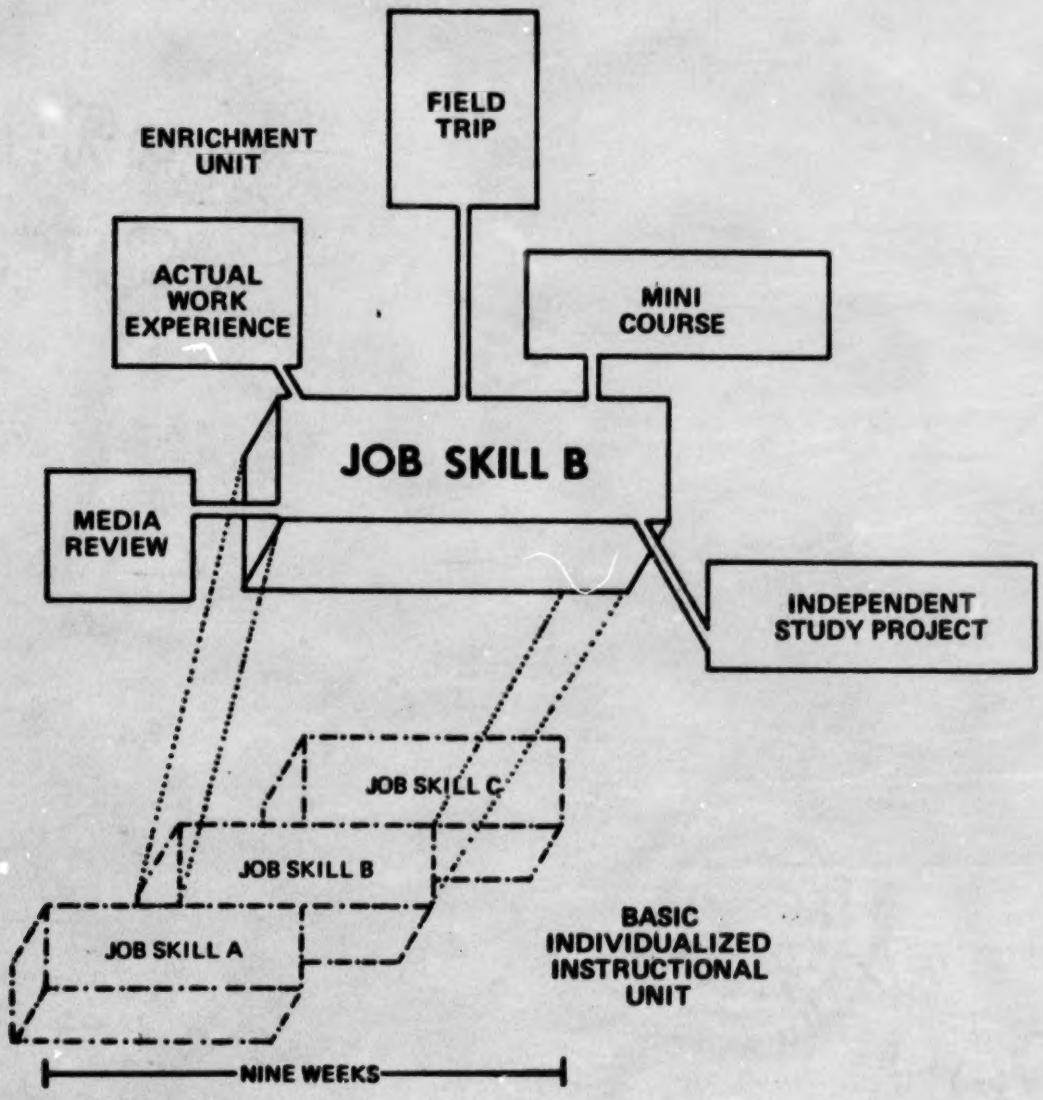
INDIVIDUALIZED AND DIFFERENTIATED INSTRUCTION



SOURCE: Stone et al. 1976.

FIGURE 3

A PROGRAM ENRICHMENT MODEL



SOURCE: Stone et al. 1976.

content. Classroom teachers especially need to understand that gifted and talented students are people with individual interests, needs, and aspirations (Ferguson 1980). Teachers of gifted and talented students should be aware of the students' individual learning styles and educational and career goals.

The three categories of concern that educators (including vocational educators) must consider as they assess their effectiveness in working with gifted and talented students are the following:

- Personal characteristics
- Classroom demeanor
- Professional performance

The basic strategies for appropriate programming for gifted and talented students are individualized instruction and differentiated programming, based on an assessment of individual learning styles. Educators must assess their effectiveness in attending to these basic components of programming for gifted and talented students as they consider their own personal qualities, classroom performance (teaching style), and professionalism.

CAREER DEVELOPMENT

Career development and occupational development are properly viewed as program components of career education (Hoyt 1977; Sellin and Birch 1980). Vocational education is an appropriate occupational development activity for gifted and talented students, and hence, a component of an appropriate career education program. Through it, gifted and talented students may have the opportunity to develop their unique interests in technical areas, thereby, facilitating the realization of their full potential.

Career Education for Gifted and Talented Students

Vocational educators should view vocational education programs for gifted and talented students within the framework of these students' career development. This is basic because many of these students' other needs are closely related.

Figure 4 illustrates the alternative career paths available to students. Since the goal of career development is self-realization, it is a lifelong process. Individuals direct (or redirect) efforts toward preparing for one of the following job entry levels:

- Level 1—requires minimal competencies (secondary vocational education)
- Level 2—requires intermediate competencies (postsecondary vocational education)
- Level 3—requires technical competencies (technical degree)
- Level 4—requires professional competencies (baccalaureate or higher degree)

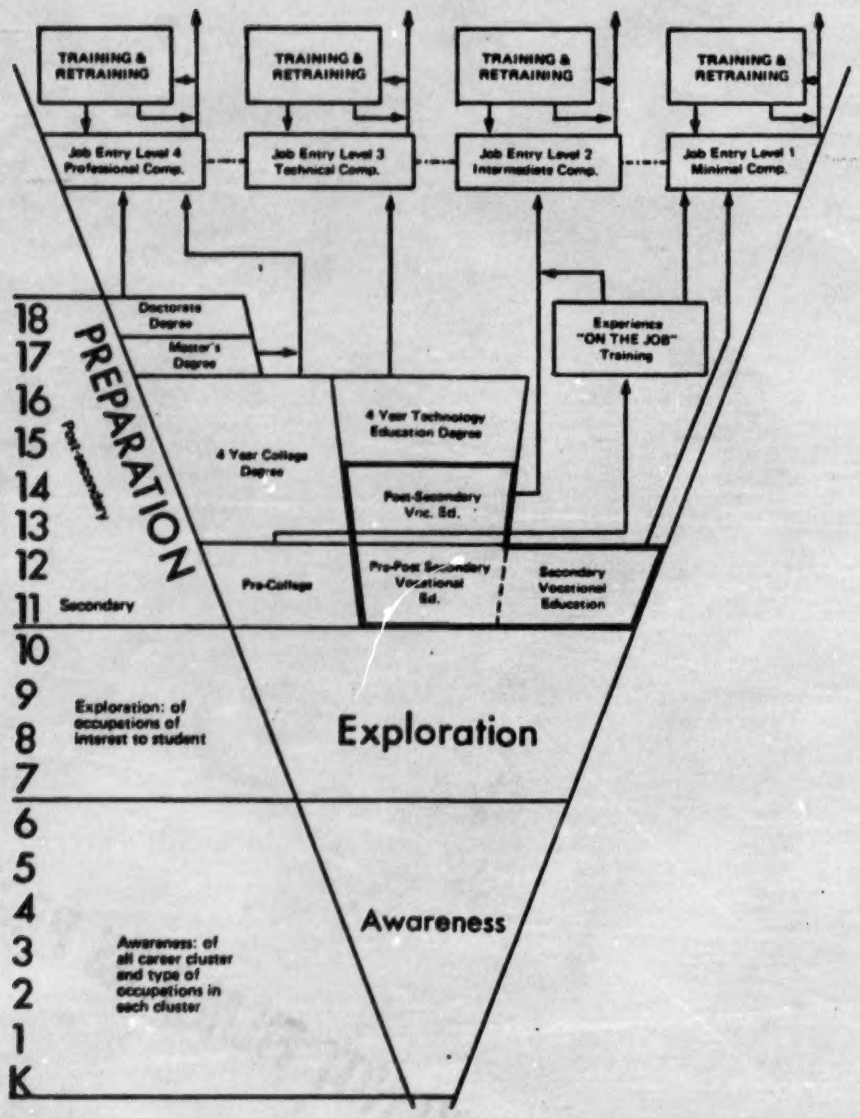
Career opportunities for gifted and talented students are unlimited. The wide range of available career options is apparent in figure 5. The occupational clusters must, of course, be viewed within the context of career development.

Career education programs to increase awareness among gifted and talented students of (1) these options and (2) their own specific interests, aptitudes, and abilities can assist them in making satisfying career decisions. Such programs can also help vocational educators to recruit gifted and talented students into vocational education.

Many gifted and talented students do not merely adopt careers, they often create them. They synthesize knowledge and transfer it into new dimensions. Through the efforts of gifted and talented individuals, others obtain employment in yet undeveloped fields (Milne 1979). Identifying gifted and talented students and developing career education programs for them can multiply the effects of educational programs, particularly vocational programs.

FIGURE 4

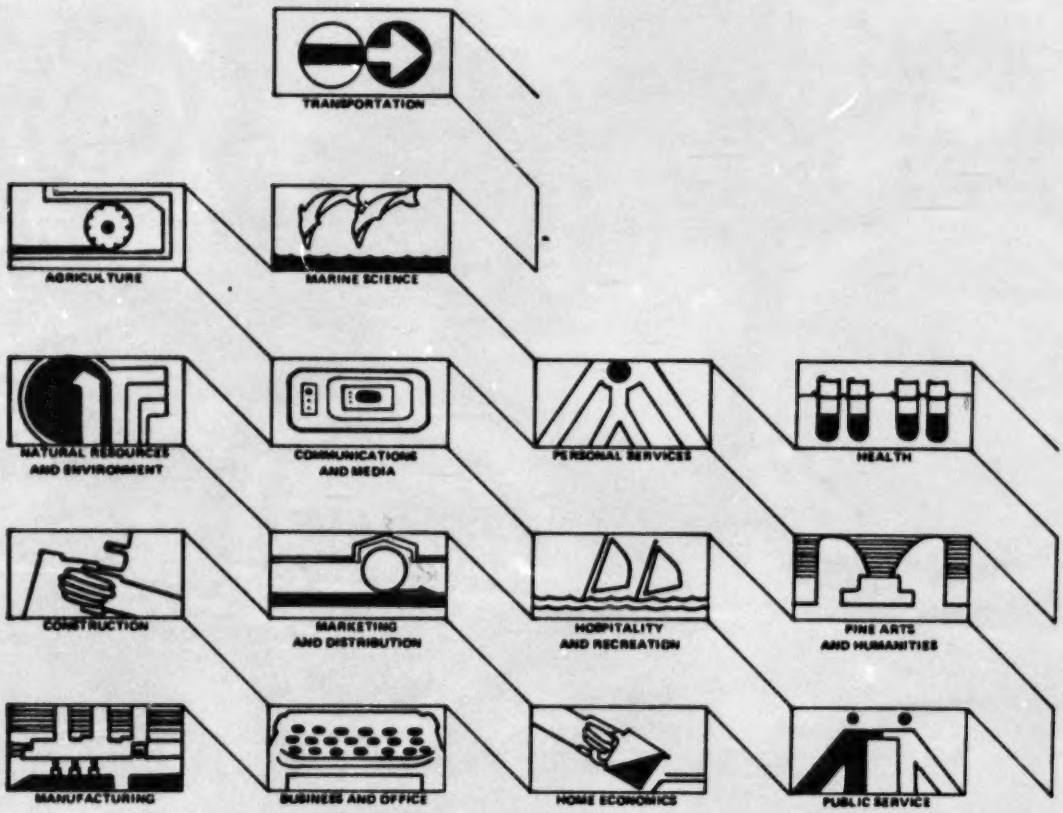
SELF-REALIZATION



SOURCE: Stone et al. 1976.

FIGURE 5

GIFTED AND TALENTED STUDENTS LOOK AT THE OCCUPATIONAL CLUSTERS



SOURCE: Stone et al. 1976.

According to Gallagher (1979), recently expanded definitions of giftedness have modified earlier characterizations of gifted and talented individuals. This suggests that career exploration for gifted and talented students should not be limited to presently recognized careers. Gifted and talented students do not follow the traditional one-life-one-career pattern and the related chronological progression from school to work to retirement (Sarason 1977). The educational-occupational interactive model shown in figure 6 has been developed to illustrate the need for continual assistance for gifted and talented students in their efforts to identify potential careers.

In order to provide effective career education for gifted and talented students, career education programs (like instructional programs) must be both differentiated and individualized. The ages and grade levels suggested for career awareness and exploration activities in figure 6, for example, may not be appropriate for gifted and talented students. Often gifted and talented students make definite career choices many years ahead of their age mates.

Two resources on career education for gifted and talented students are available to assist vocational educators and guidance counselors in their efforts to provide appropriate career education programs for gifted and talented students. These are the June 1981 issue of the *Journal of Career Education* and an information analysis paper entitled *Career Education for the Gifted and Talented* (Kerr 1981). Both of these sources include the kindergarten through twelfth grade career education model for gifted and talented students shown in figure 7.

Career Guidance

It has been suggested that counselors provide career guidance less effectively to gifted and talented students than to other students. This raises an important concern, because in both secondary and postsecondary schools, counselors have the opportunity to bring together gifted and talented students and vocational education programs (Kuhlman and Harrison 1981). Guidance counselors are in the position to be a force for continuity in gifted and talented students' lives (Milne 1976). Counselors' responsibilities include assisting students to prepare for the world of work (Keller 1962), but whereas counselors are praised by some for their work, most parents believe that their children receive little or no career guidance (Gallup 1979).

Although guidance counselors are but one part of the educational team, they are the key to effective career guidance. Counseling is as important as instruction for gifted and talented students (Sellin and Birch 1980). The extent to which counselors contribute to the career development of gifted and talented students depends on their acceptance of the challenges and responsibilities on the educational membership team (Hoyt 1977). Counselors can and should assume leadership in cooperating with other staff members to develop appropriate information-rich career education programs for gifted and talented students.

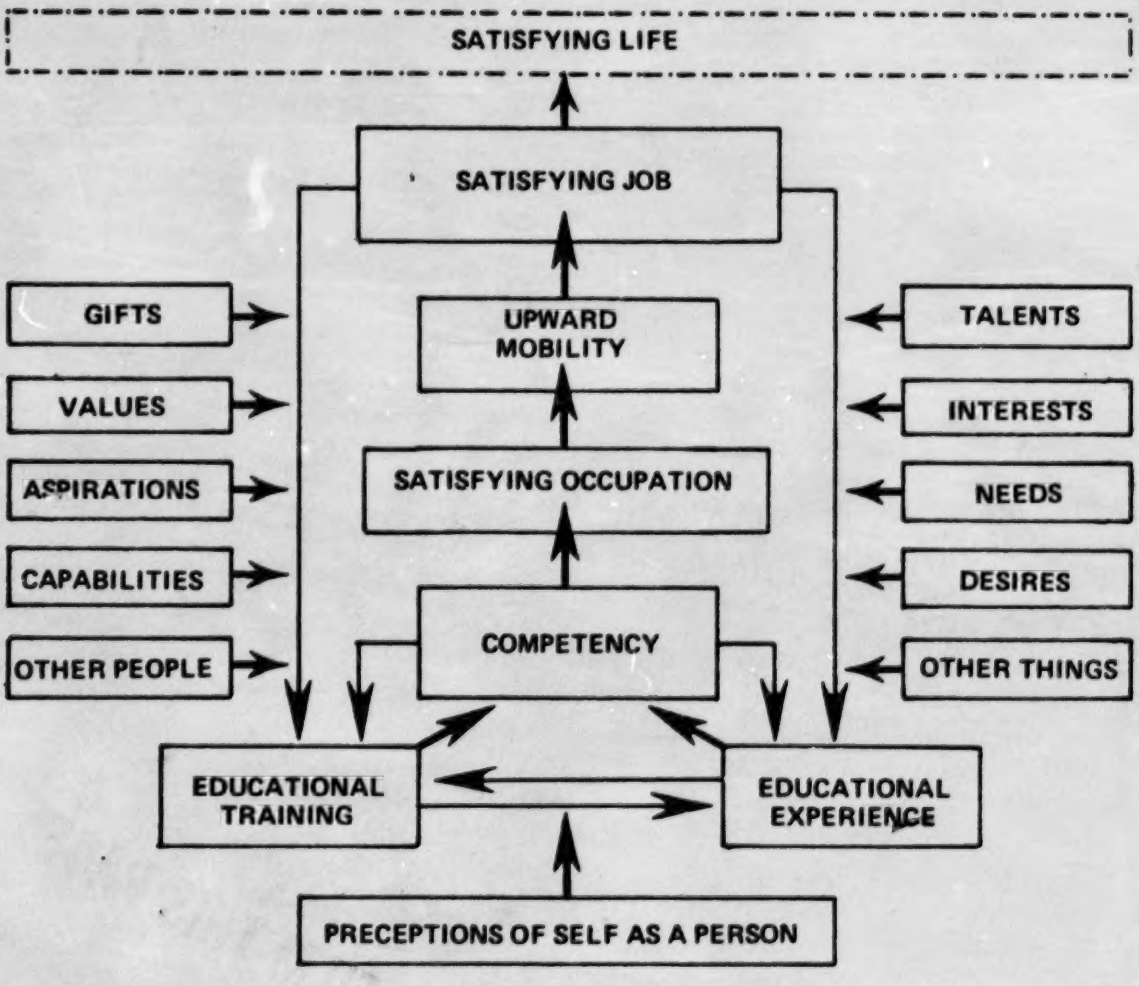
Career guidance is not the counselor's sole responsibility in providing services for gifted and talented students; it is only one of several functions (Palmo and DeVantier 1976). Gifted and talented students, perhaps more than any others, need encouragement, support, and reassurance.

Disadvantaged Students

Reducing barriers to equal educational opportunities for disadvantaged and handicapped students, members of minority groups, and females has been a major focus of career education programs in the past decade. These students may need special counselor support, however, as

FIGURE 6

EDUCATIONAL-OCCUPATIONAL INTERACTION MODEL



SOURCE: Milne et al. 1976.

FIGURE 7

A K-12 CAREER EDUCATION MODEL FOR THE GIFTED

K-3	4-6	7-8	9-12
Strand I • Awareness of famous people and what they do.	**Strand I** • Focus on process skill development in the areas of analysis/synthesis/ evaluation through examining lives of famous people	**Strand I** • Establishment of biography clubs that discuss readings	**Strand II** • Small group counseling on the integration of skills for life-planning
Strand II • Small group work on coping skills and social interaction	**Strand II** • Small group counseling on the skills of group dynamics, leadership, and communication	**Strand II** • Small group counseling on motivation and task commitment issues	**Strand III** • Offer independent study options that provide alternative modalities and content for learning
Strand III • Encouragement in the development of aptitudes at a self-pacing rate • Avoidance of sex-stereotyping patterns of behavior in play and work	**Strand III** • Establishment of mentor program for the most goal-directed students	**Strand III** • Encouragement of individual and group projects in a specific field of inquiry • Continue mentor program and expand	**Strand IV** • Continued testing and analysis of results
	Strand IV • Administration of interest, personality, and ability inventories	**Strand IV** • Individual counseling on results of testing for ability and interest	**Strand V** • College counseling around choice of institution and course taking
		Strand V • Counseling around high school course options	**Strand VI** • Course in career area • Internship for at least one semester

SOURCE: Van Tassel-Baska 1981.

identifying and providing services to such students—especially those who are gifted or talented—has proved to be difficult. Being gifted or talented and economically disadvantaged puts a student in double jeopardy (Milne 1976). An education that meets the needs of these students will allow them opportunities to develop commensurate with their potential (Frasier 1980).

In planning educational programs, including vocational education, for disadvantaged students, counselors must view every student as having the potential for success in the world of work. Vocational education programs have offered opportunities to disadvantaged students that general education programs have not. Persons aspiring to upward mobility have often achieved it through vocational education programs.

Vocational education has attracted these persons for the following reasons:

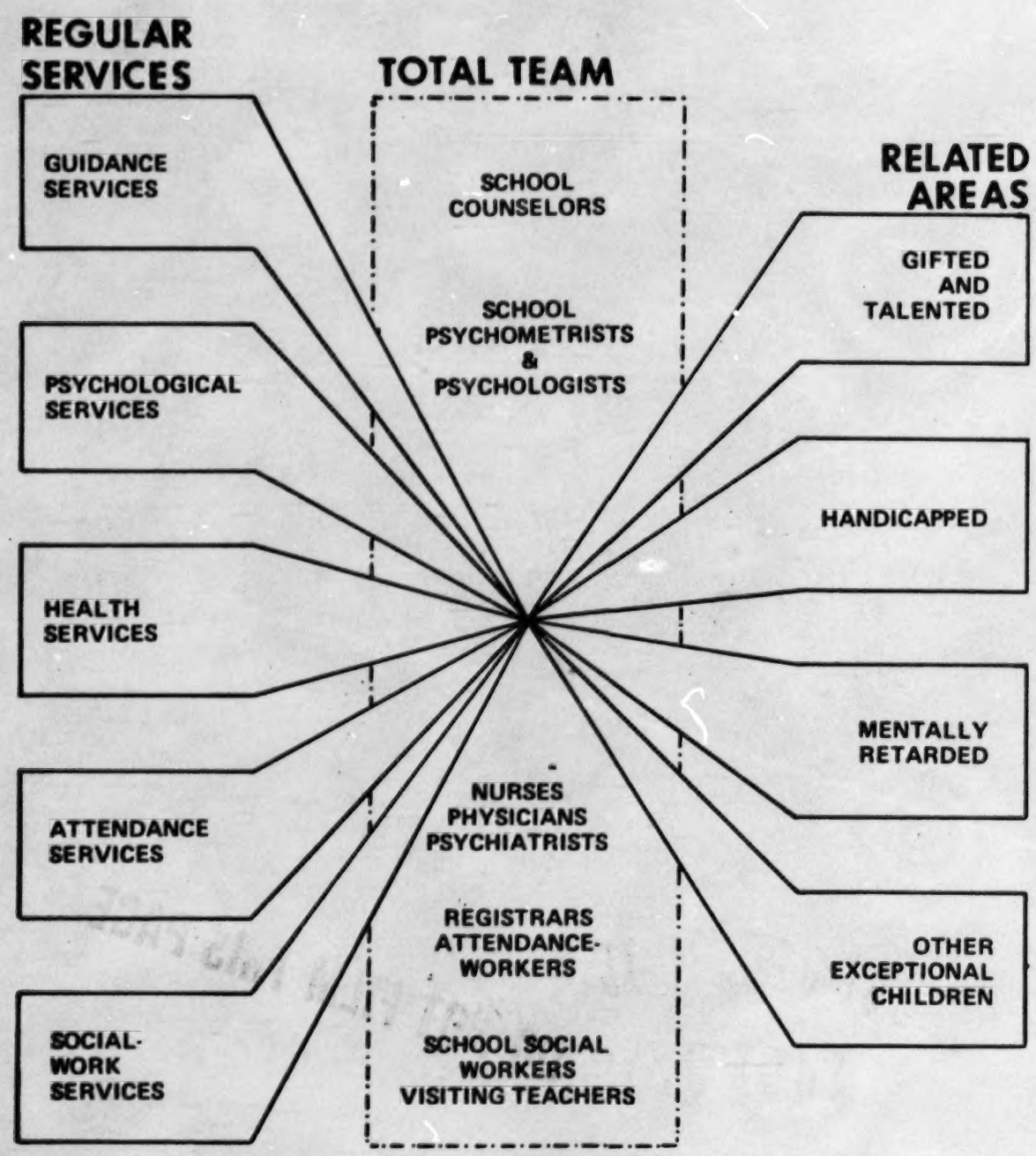
- Vocational education is designed to teach job-related skills.
- Few academic courses are required.
- Instructors typically have had work experience in the area they teach.
- The learning environment is similar to the work setting.
- The course of study can be completed in a relatively brief time (often in one year).

Discriminatory practices have restricted educational opportunities for females, handicapped students, and members of minority and economically disadvantaged groups. However, they have the right to realize their potential contribution to themselves and to society (Jarolimek 1981). America has made great progress toward equal opportunity in employment, but the challenges of the future include greater efforts toward nondiscrimination in vocational education programming, including efforts to enroll students in nontraditional occupational programs.

The relationship of services for gifted talented students to the total responsibilities of guidance counselors and the relationship of counseling services to pupil personnel services are illustrated in figure 8. Additional resources related to career education and guidance of gifted and talented students may be obtained through the sources listed in Appendix C.

FIGURE 8

PUPIL PERSONNEL SERVICES



SOURCE: Milne et al. 1976.

SUMMARY

We can no longer depend on a liberal education to make gifted and talented students "information rich." Today's students will be our social, educational, and political leaders in the year 2000. It is imperative that they be educated in sophisticated new communications, transportation, energy, food production, environmental protection, and construction technologies.

According to Schwartz (1977) technology has successfully solved problems of agricultural and industrial productivity, communications, knowledge dissemination, transportation, and the production of synthetics. This success has been due largely to the fact that (a) the majority of people could use these technologies with minimal education and (b) there was sufficient standardization of parts and processes for relatively easy transfer of learning.

Some writers suggest that much of today's adult work force "grew up with" technological development. At the beginning of World War II, the average educated American (with about a sixth grade education) could be trained to be fairly technologically sound with basic courses in electricity, gasoline engines, production, and construction.

Now most Americans do not understand the basic technology that provides them with consumer goods. Significantly more education is needed in order to understand today's ingenious technological advancements. In a postindustrial society, we must place a higher value on possessing and effectively using these new technologies (Toffler 1980). Whether or not we are able to cope with our new environment will depend to a large extent on what kinds of skills are taught to our students (Ornstein and Levine 1981).

Forecasting the Future

Educators are joining scholars in other fields in speculating about the future. One thing about which we can be certain is that the present rapid rate of change will continue. Educational change is a response to social change. An increase in programs for gifted and talented students appears certain. Although it appears likely that there will be continued interest in providing vocational education programs for gifted students, there are several problems that might deter progress, for example, such socioeconomic factors as inflation and decreasing school enrollments.

The assessment of giftedness in the future will probably be based on a broader definition and will be less dependent on single measures of intelligence and academic abilities. Research will be most likely to provide greater sophistication in measures of values, attitudes, and aspirations. Similarly, weaknesses in testing, such as cultural biases, will be overcome (Lewis 1980). If teachers begin to accept the notion that students are in a process of "becoming," according to Delisle (1981), they might mitigate the growing concern about the emphasis on proving the merits of differentiated programs by students' achievements—the books they author or the robots they design.

Greater refinement will be likely to occur in defining and developing creativity. The research on learning styles and cerebral dominance (right-brain versus left-brain) most certainly will continue. As the relationship between creativity and thinking processes becomes better understood, we will come to value individual differences more highly. Viewed as a process of "becoming," creativity will be thought of as a characteristic that can be developed in all students rather than as a gift that only certain students possess.

Vocational educators will, in all probability, make a concerted effort to develop suitable programs for gifted and talented students and to enroll them in those programs. The following are several suggestions for doing so:

- Improve the image of vocational education through public relations programs.
- Obtain training in relevant new technologies.
- Obtain information about working effectively with gifted and talented students.
- Evaluate programs in light of the needs of gifted and talented students and assess the potential of those programs for both attracting and effectively serving such students.
- Develop differentiated programs and individualized instruction.
- Establish a communications network to disseminate information on programs for gifted and talented students in vocational education.

Such a communications network can provide vocational educators with access to a variety of strategies for achieving the following three important goals:

- To identify gifted and talented students
- To modify curriculum in order to meet the needs of these students
- To enhance the career development of gifted and talented students

As vocational educators gain access to instruments for assessing the learning styles of gifted and talented students, they will be able to match their teaching styles to students' learning styles. Information about appropriate instructional materials for individualization and differentiation will become ever more readily available. For example, units for job-skill training programs that are suitable as models for working with gifted and talented students will be developed. With a minimum of modifications, these will be adapted for use in individualized instruction.

The way to the future may well be through America's gifted and talented youth. Failure to develop all the potential of these young people can only result in a diminished quality of life for future generations. Many gifted and talented youth are especially interested in technical subjects. Vocational education can offer excellent career options to these students. The provision of appropriate, high-quality programs will motivate these students to pursue their technical interests through vocational education.

REFERENCES

Barbe, W. B., and Swassing, R. H. *Teaching Through Modality Strengths: Concepts and Practices.* Columbus, OH: Zaner-Bloser, 1979.

Becker, R. J. "What Are the Objectives of Vocational Education?" *Phi Delta Kappan* 61 (1980): 533-536.

Bloom, B. S. *Human Characteristics and School Learning.* New York: McGraw-Hill, 1976.

Curtis, J. B.; Justice, F. L.; and Curtis, S. M. "Gifted and Talented Students in Vocational Education: Review and Synthesis of the Literature." *The Journal of Vocational Education Research* 3 (1980): 55-65.

Davis, D. S., and Schwimmer, P. C. *Relational Thinking Styles Workshop Handbook.* Tucson: Educational Consultation, 1980.

Davis, D. S., and Schwimmer, P. C. "Style—A Manner of Thinking." *Educational Leadership* 38 (1981): 336-337.

Delisle, J. "The Non-Productive Gifted Child: A Contradiction of Terms?" *Roeper Review* 3 (1981): 20-21.

Dunn, R., and Dunn, K. *Teaching Students Through Their Individual Learning Styles: A Practical Approach.* Reston, VA: Reston Publishing Company, 1978.

Ellis, J. R. *A Final Report: An Exploratory Study of Professional Opinions and Current Practices Regarding Career Education for Exceptionally Gifted and Talented Students.* De Kalb: Northern Illinois University, 1976.

Evans, R. N. "Reauthorization and the Redefinition of Vocational Education." *VocEd* 56 (1981): 30-34.

Federal Register, May 6, 1976.

Ferguson, C. D. "Vocational Guidance/Vocational Education for the Mentally Gifted High School Student." In *Opening Doors for the Gifted.* Ceres, CA: Ceres Unified School District, 1980.

Ford, B. G., and Ellis, J. R. "Career Education: A Continuing Need of Illinois Gifted Students." *Journal for the Education of the Gifted* 2 (1979): 153.

Fox, L. H. "Identification and Program Planning Models and Methods." In *Readings in Curriculum Development for the Gifted,* edited by David M. Jackson. Guilford, CT: Special Learning Corporation, 1980.

Frasier, M. "Rethinking the Issues Regarding the Culturally Disadvantaged Gifted." In *Readings in Curriculum Development for the Gifted,* edited by David M. Jackson. Guilford, CT: Special Learning Corporation, 1980.

Gallagher, J. J. "Issues in Education for the Gifted." In *The Gifted and Talented, Their Education and Development,* edited by A. H. Passow. The Seventy-Eighth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education, distributed by the University of Chicago Press, 1979.

Gallagher, J. J. *Teaching the Gifted Child.* 2d ed. Boston: Allyn and Bacon, 1975.

Gallup, G. J. "The Eleventh Annual Gallup Poll of Public Attitudes Toward the Public Schools." *Phi Delta Kappan* 61 (1979): 33-46.

Gearhart, B. R. *Special Education for the 80's.* St. Louis: C. V. Mosby, 1980.

Gourley, T. J., and Richert, S. "Beyond the Classroom." In *An Anthology of Articles on Gifted and Talented Education.* Sewell, NJ: Northeast Exchange, 1978.

Gowan, J. C. "The Academically Talented Student and Guidance." *Guidance and the Exceptional Student,* Series V. New York: Houghton Mifflin, 1971.

Gregorc, A. F., and Ward, H. B. "A New Definition for Individual." *NASSP Bulletin,* February 1977.

Griggs, S. A., and Price, G. E. "Learning Styles of the Gifted." In *Student Learning Styles: Diagnosing and Prescribing Programs.* Reston, VA: National Association of Secondary School Principals, 1979.

Gustafson, R. A., and Laferts, O. S. *Identification of the Gifted and Talented in the Secondary and Vocational Schools of Vermont.* Montpelier: Division of Vocational-Technical Education, Vermont Department of Education, June 1978.

Holstein, L. "Extraordinary People: The Blessings and Burdens of Being Gifted." *OSU Quest* (The Ohio State University) 3, no. 4 (1981): 4-5.

Hoyt, K. B. "Career Education: Challenges for Counselors." In *Vocational Guidance and Career Development,* edited by Herman J. Peters and James C. Hansen. 3d ed. New York: Macmillan, 1977.

Hunt, D. E. "Learning Style and the Independence of Practice and Theory." *Phi Delta Kappan* 62 (1981): 647.

Jackson, D. M. "The Merging National and State Concern." *The Gifted and Talented, Their Education and Development,* edited by A. H. Passow. The Seventy Eighth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education, distributed by the University of Chicago Press, 1979.

Jarolimek, J. *The Schools in Contemporary Society.* New York: Macmillan, 1981.

Johanningmeir, E. V. *Americans and Their Schools.* Chicago: Rand McNally College Publishing Company, 1980.

Journal of Career Education 7, no. 4 (1981): entire issue.

Kaplan, S. N. *Providing Programs for the Gifted and Talented: A Handbook.* Ventura, CA: Office of the Ventura County Superintendent of Schools, 1974.

Keefe, J. W. "School Applications of the Learning Style Concept." In *Student Learning Styles: Diagnosing and Prescribing Programs,* edited by J. W. Keefe. Reston, VA: National Association of Secondary School Principals, 1979.

Keller, F. J. *Vocationally Talented Pupils.* New Brunswick, NJ: The Rutgers State University, 1962.

Kerr, B. A. *Career Education for the Gifted and Talented.* Information series no. 230. Columbus, OH: ERIC Clearinghouse on Adult, Career, and Vocational Education, The National Center for Research in Vocational Education, The Ohio State University, 1981.

Kolb, D. A. "Learning Styles and Disciplinary Differences." In *The Modern American College,* edited by Arthur Chickering and Associates. San Francisco: Jossey-Bass, 1981.

Kuhlman, J., and Harrison, M. A. "Anatomy of Cooperation in a Career Education Program." *The Vocational Guidance Quarterly* 29 (1981): 274.

Lewis, A. J., ed. *New Vistas in Special Education.* Princeton, NJ: Educational Testing Service, 1980.

Mandell, C. J., and Fiscus, E. D. *Understanding Exceptional People.* St. Paul, MN: West Publishing Co., 1981.

Martinson, R. A. *The Identification of the Gifted and Talented.* Ventura, CA: Office of the Ventura County Superintendent of Schools, 1974.

Milne, B. G. "Career Education." In *The Gifted and the Talented, Their Education and Development,* edited by A. H. Passow. The Seventy-Eighth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education, distributed by the University of Chicago Press, 1979.

Milne, B. G. "What Is the Best Approach? Programs for the Gifted in Rural Areas." *NASSP Bulletin* 60 (1976): 60-66.

Milne, B. G., and Lindekugel, K. J. *Vocational Education: An Opportunity for the Gifted and Talented Students.* Vermillion, SD: Educational Research and Service Center, School of Education, University of South Dakota, 1976. (ERIC Document Reproduction Service No. ED 146 454).

Morris, V. S., and Pai, Y. *Philosophy and the American School: An Introduction to the Philosophy of Education.* 2d ed. Boston: Houghton Mifflin, 1976.

National Advisory Council on Vocational Education. First Annual Report. Washington, DC: U.S. Office of Education, 1969.

Newland, T. E. *The Gifted in Socioeducational Perspective.* Englewood Cliffs, NJ: Prentice-Hall, 1976.

Ornstein, A. C., and Levine, D. V. *An Introduction to the Foundations of Education.* 2d ed. Boston: Houghton Mifflin, 1981.

Palmo, A. J., and DeVantier, J. "An Examination of the Counseling Needs of Vo-Tech Students." *The Vocational Guidance Quarterly* 25 (1976): 170.

Passow, A. H. "Policies and Practices for Special Populations of the Gifted and the Talented." In *The Gifted and the Talented, Their Education and Development,* edited by A. H. Passow. The Seventy-Eighth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education, distributed by the University of Chicago Press, 1979.

Passow, A. H., and Tannenbaum, A. J. "Education of the Gifted and Talented." *NASSP Bulletin* 60 (1976): 3-12.

Renzulli, J. S. "What Makes Giftedness? Reexamining a Definition." *Phi Delta Kappan* (November 1978): 180-184.

Renzulli, J. S., and Callahan, C. *Evaluation of Programs for the Gifted and Talented.* Washington, DC: U.S. Office of Education, Office of the Gifted and Talented, 1978.

Sarason, S. B. *Work, Aging and Social Change: Professionals and the One-Life–One-Career Imperative.* New York: The Free Press, 1977.

Schwartz, P.; Teige, P. J.; and Harman, W. W. "In Search of Tomorrow's Crises." *The Futurist* 11 (1977): 169.

Sewell, W. H. "Notes on Educational, Occupational, and Economic Achievement in American Society." *Phi Delta Kappan* 62 (1981): 322.

Sellin, D. F., and Birch, J. W. *Educating Gifted and Talented Learners.* Rockville, MD: Aspen Systems Corporation, 1980.

Smith, A. J. "A Mammoth Job Well Begun." *VocEd* 56 (1981): 48.

Sperry, L. *Learning Performance and Individual Differences: Essays and Readings.* Glenview, IL: Scott Foresman, 1972.

Stone, T.; Milne, B. G.; Milburn, C. M.; and Johnson, R. *Vocational Education: A New Dimension for the Gifted and Talented Students—A Vocational Teacher's Resource Guide.* Vermillion: University of South Dakota, 1976. (ERIC Document Reproduction Service No. ED 146 456).

Tannenbaum, A. J. "Pre-Sputnik to Post-Watergate Concern About the Gifted." In *The Gifted and Talented, Their Education and Development,* edited by A. H. Passow. The Seventy Eighth Yearbook of the National Society for the Study of Education, Part I. Chicago: National Society for the Study of Education, distributed by the University of Chicago Press, 1979.

Toffler, A. *The Third Wave.* New York: Bantam Books, 1980.

Torrance, E. P. *Gifted Children in the Classroom.* New York: Macmillan, 1965.

Van Tassel-Baska, J. "A Comprehensive Model of Career Education for the Gifted and Talented." *Journal of Career Education* 7, no. 4 (1981): 325-332.

Wernick, C. *Occupational Education for the Gifted and Talented.* Brooklyn: Board of Education, City of New York, 1980.

Whitmore, J. R. *Giftedness, Conflict, and Underachievement.* Boston: Allyn and Bacon, 1980.

Wirth, A. G. *John Dewey As Educator: His Design for Work in Education, 1894-1904.* New York: Wiley, 1966.

Woodring, P. "Vocational Education: How Much, What Kind, and When?" *Phi Delta Kappan* 60 (1979): 644.

APPENDIX A

A SAMPLE SELECTION OF RELEVANT DOCUMENTS IN THE ERIC DATA BASE

Articles

EJ 142 417

Beam, C. C. "Secondary Program in Ornamental Horticulture for the Talented Student." *Agricultural Education Magazine* 49, no. 2 (1976): 32.

Various ways are suggested by which the more talented student may be challenged in an accelerated program while, at the same time, provision may be made for interaction among students of varying levels. Competitive contests among teams led by talented students are an important element of the horticulture course described.

EJ 142 416

Lee, Jasper S. "Teaching Talented Students in Vocational Agriculture." *Agricultural Education Magazine* 49, no. 2 (1976): 29-30.

Many talented students enroll in vocational agriculture, but, because they may have been labeled "slow" or "difficult" by academic teachers, the extent of their talent often goes unrecognized. The nature of talent is discussed, and means of providing for talented students are suggested.

EJ 142 415

Diehl, I. W. "Attracting the Talented Students." *Agricultural Education Magazine* 49, no. 2 (1976): 28.

Suggestions for drawing bright rural students to vocational agriculture programs include introducing the image of farm life-styles as pleasant to young children through a Food for America program, offering FFA slide programs to junior high students, and actively recruiting upperclass high school students. Enlightened, challenging programs attract best.

EJ 087 438

Shirey, Sharon M. "The Academically Talented Student in Business Education." *Business Education World* 54, no. 3 (1974): 26-27.

The upper 15 to 20 percent of secondary school students may be provided for through enrichment within existing classes, ability grouping, and acceleration. A number of recommendations are made.

Reports

ED 181 323

Campbell-Thrane, Lucille, comp. *"It Isn't Easy Being Special"—Resources: Agencies and Organizations That Serve Special Needs Learners.* Research and Development Series no. 178. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Available from: National Center Publications Office, The National Center for Research in Vocational Education, 1960 Kenny Road, Columbus, OH 43210 ($3.25; six piece set, $25.00) or the ERIC Document Reproduction Service.*

This directory identifies key agencies and organizations that provide guidance and assistance to anyone who works with the special needs learner. The offices and establishments described in the directory represent the numerous organizations and agencies responsive to the academic and vocational requirements of the following special needs populations: (1) American Indians, (2) Asian Americans, (3) Appalachian whites, (4) bilinguals and those with limited English proficiency, (5) black Americans, (6) gifted and talented, (8) handicapped, (8) Hispanics, (9) the incarcerated, (10) migrants, and (11) older Americans. Each section is identified by specific population and tells where to locate agencies and organizations. Contacts are listed in alphabetical order within each section.

ED 181 322

Campbell-Thrane, Lucille, ed. *"It Isn't Easy Being Special"—Here Are Programs That Work: Selected Vocational Programs and Practices for Learners With Special Needs.* Research and Development Series no. 177. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Available from: National Center Publications Office, The National Center for Research in Vocational Education, 1960 Kenny Road, Columbus, OH 43210 ($13.00; six-piece set, $25.00) or the ERIC Document Reproduction Service.

Focusing on vocational education programs that have been successful in increasing access to and performance in vocational education, this publication contains descriptions and abstracts of 137 programs for special needs populations. The first of two major sections contains sixteen site visit reports that include program name, address, contact person, purpose, objectives, and a brief overview. In addition, information is provided about population served, activities and support services, administrative and staffing patterns of the program, and evaluation procedures. Section 2 presents 121 abstracts of general and vocational programs for special people. The abstracts are grouped alphabetically by project title under eight population groups served: (1) American Indian, (2) bilinguals and those with limited English proficiency, (3) disadvantaged, (4) disadvantaged/handicapped, (5) gifted and talented, (6) handicapped, (7) the incarcerated, and (8) migrants.

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*For documents available from the ERIC Document Reproduction Service, contact: ERIC Document Reproduction Service, P.O. Box 190, Arlington, VA 22210; phone (703) 841-1212.

ED 181 321

Campbell-Thrane, Lucille, ed. *"It Isn't Easy Being Special"—Let's Find the Special People: Identifying and Locating the Special Needs Learners.* Research and Development Series No. 176. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Available from: National Center Publications Office, The National Center for Research in Vocational Education, 1960 Kenny Road, Columbus, OH 43210 ($3.20; six piece set, $25.00), or the ERIC Document Reproduction Service.

This publication presents a data collection system useful in measuring the success of vocational programs for special needs populations nationwide. The first of four chapters provides a general characterization of special populations and specific definitions for each subgroup commonly designated as a special needs population. U.S. Office of Education data (1976), discussed in chapter 2, give an indication of the responsiveness of vocational education programs to the needs of special groups nationwide. Chapter 2 also discusses some of the problems of collecting and analyzing data about special needs groups. Each profile is followed by a summary of pertinent literature on the needs of that special population in vocation education programs. The final chapter explores data needs for effective program planning and describes an exemplary data collection system.

ED 181 320

Campbell-Thrane, Lucille, ed. *"It Isn't Easy Being Special"—Let's Work Together: Intervention Strategies for Learners With Special Needs.* Research and Development Series no. 175. Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Available from: National Center Publications Office, The National Center for Research in Vocational Education, 1960 Kenny Road, Columbus, OH 43210 ($3.20; six piece set $25.00), or the ERIC Document Reproduction Service.

Divided into four chapters, this monograph focuses on strategies that meet equally the common needs of all students and the unique needs of special students. Chapter 1, "Preparing to Meet the Needs of Special Students: Let's Look at Our Responsibilities," identifies special needs populations and presents a list of responsibilities for teachers, counselors, and administrators in helping the special needs learner to succeed in a vocational program. The second chapter explores ten educational needs common to all learners and discusses basic strategies that may help teachers, counselors, administrators, and others to perform effectively with the special student. Chapter 3 provides lists of unique needs of seven special groups and presents strategies for meeting them. Special groups included are (1) American Indians, (2) individuals with limited English proficiency, (3) inmates of correctional institutions, (4) minority groups, (5) gifted/talented students, (6) handicapped students, and (7) migrants. The concluding chapter gives steps to improve access to vocational programs and to improve student performance.

ED 163 207

Creatively Gifted Students in Vocational Education, 1977-78. Final Report. Glassboro, NJ: Glassboro State College, Department of Industrial Education and Technology, 1978.

Available from: ERIC Document Reproduction Service (microfiche only).

This project was undertaken to develop programs for gifted/talented students in vocational education. The primary considerations were to investigate methods to identify highly creative students and to develop a curriculum model to nurture creativity. A seminar on creativity was held at Glassboro State College for the purpose of assisting in the development of gifted/talented

programs in New Jersey. The seminar participants were divided into four task force sessions. Each task force was asked to respond to several questions, materials, and items. At the end of the day, a general session was held and a spokesperson for each group reported their deliberations. Specific recommendations for gifted programs resulted from these exchanges, and a guide to assist schools in beginning a program was developed. The guide included a number of details concerning a rationale, guiding principles, considerations unique to vocational school, underachievers, parent groups, creativity assessment instruments, problem solving, a format for developing curriculum materials, and a number of problems for gifted students. (The complete guide is included in this document along with a program proposal for teaching gifted/talented students in vocational education; the proposal includes course rationale, objectives, and topical outline.)

ED 152 010

Milne, Bruce G. *Developing a Written Plan for Implementing the Vocational Preparation of the Gifted and the Talented Students in Secondary and Post-Secondary Education.* Vermillion, SD: University of South Dakota, Educational Research and Service Center, 1976.

Available from: ERIC Document Reproduction Service (microfiche only).

Presented is a planning guide for developing vocational education programs for gifted and talented students at the secondary and postsecondary levels. Outlined are the criteria and some suggestions for developing the state's position statement and goal statement. The remainder of the document consists of a matrix for the written plan which is divided into five columns: the first column indicates the major elements under consideration (position statement, planning, goal statement, objectives, program, and reporting); the second column expands the implications of each element into objectives; the third and fourth columns show the implementation of the objectives, assign the Phase I and Phase II tasks, and designate those responsible for carrying out the task implementation; and the last column is for milestones or dates for accomplishment.

ED 146 457

Development of Curricula for Vocational Preparation of the Gifted and Talented Students in Secondary and Post-Secondary Education. Final Technical Report. Vermillion, SD: University of South Dakota, School of Education, June 1977.

Available from: ERIC Document Reproduction Service.

Objectives of the project were: (1) to call the attention of secondary and postsecondary faculties to the opportunities in vocational programs for gifted and talented students to work toward their career goals, (2) to assist guidance counselors to recognize opportunities for the gifted and talented in vocational programs, (3) to encourage school administrators to make specific plans for recruiting and enrolling the gifted and talented in appropriate vocational programs, (4) to develop a resource guide for vocational teachers to use in individualizing programs and courses to provide for the unique interests and abilities of gifted and talented students, and (5) to prepare a manual for guidance counselors which will include recommendations for counseling gifted and talented students about vocational education programs and their usefulness in career planning. A major project component was to conduct five conferences during which teams from each of the fifty states and territories would develop a plan of action for implementing the inclusion of the gifted and talented in a local and area vocational program within their respective states. Conclusions of a third-party evaluation based on examination of objectives and their achievement included the following: awareness of the theme and its implications to the total field of education was presented and well received across the nation, and it is safe to presume that an impact has been made as a result of the dissemination of curricular materials. Appended to the report is the 140-page product of the five conferences, the fifty state plans of action for vocational preparation of gifted and talented students. (The teacher resource guide, counselor manual, and brochure developed during the project are available separately.)

ED 146 456

Stone, Thomas; Milne, Bruce G.; Milburne, Corinne; and Johnson, Richard. *Vocational Education: A New Dimension for the Gifted and Talented Students—A Vocational Teacher's Resource Guide.* Vermillion, SD: Educational Research and Service Center, University of South Dakota, 1976.

Available from: ERIC Document Reproduction Service.

Focus in this resource guide for secondary and postsecondary vocational teachers is on individualizing programs and courses to provide for the unique interests and abilities of gifted and talented students. An overview is presented of the status of vocational education and how it can enhance the occupational development of gifted youth. This is followed by discussion of learning characteristics of gifted children and their identification, placement, and programming. Utilization of the fifteen occupational clusters set forth by the U.S. Office of Education is emphasized throughout as an aid in the search of potentially satisfying jobs and educational and occupational ladders for the gifted. Topics addressed under curriculum and instruction for the gifted and talented include instructional alternatives, individualized instruction, an enrichment model, differentiated instruction, and program modifications. Under the heading of program administration are guidelines for shaping a gifted program and notes on the role of the vocational teacher with the gifted. Five program descriptions are presented as examples of those which could attract and hold the interest of gifted and talented students. Case studies of students who exhibited outstanding potential and took part in vocational preparation programs are also included. Each differs in the time in the student's life-occupation when the training occurred. A list of professional organizations for further reference and an annotated bibliography are appended.

ED 146 455

Milne, Bruce G.; Christiansen, Orla; England, Joan; Milburn, Corrine; and Stone, Thomas. *Vocational Education: A Challenging Alternative for the Gifted and Talented Student. A Manual for Guidance Counselors.* Vermillion, SD: Educational Research and Service Center, University of South Dakota, 1976.

Available from: ERIC Document Reproduction Service.

Focus of this manual for secondary and postsecondary guidance counselors is on the counseling of gifted and talented students about vocational education programs and their usefulness in career planning. Introductory sections address the current status of vocational education, gifted education, and guidance counseling with attention to the guidance counselor's role in an appropriate synthesis of the three. The concept of educational and occupational ladders is presented with respect to what vocational education can contribute to the gifted and talented student. Treatment is geared to the fifteen occupational clusters. A section on implementation of a guidance program for the gifted and talented in vocational preparation lists suggested counselor activities with students, school staff, vocational educators, parents, and community members. Several sections are devoted to the process of identifying the gifted. Methods of identification examined include characteristics checklists, observation techniques, standardized tests, nomination techniques, interview techniques, and use of case studies. Several special identification concerns are discussed: characteristics of older gifted youth, working with the handicapped, working with minority groups and the culturally different, sex role stereotyping, and rural-isolated students. Emphasis throughout the handbook is on the need for the gifted and talented student to be given viable alternatives in vocational/occupational training in pursuit of a life-satisfying career. A bibliography is included.

ED 146 454

Milne, Bruce G., and Lindekugel, Karen J. *Vocational Education: An Opportunity for the Gifted and the Talented Students.* Vermillion, SD: Educational Research and Service Center, University of South Dakota, 1976.

Available from: ERIC Document Reproduction Service.

Developed particularly for vocational educators, guidance and counseling personnel, and directors of gifted education programs, this booklet (brochure) is intended to bring about a greater awareness of the occupational opportunities for gifted and talented students through vocational education. Initial discussion focuses on definition and need for synthesis of the following concepts: equal opportunity, guidance and counseling, special education, career education, gifted education, and vocational education. Some characteristics of gifted and talented students and their identification are discussed briefly. The remainder of the booklet is an overview of the possible vocational programs and potentially satisfying jobs for the gifted/talented. Final emphasis is on the importance of guidance and counseling for the gifted. Photographs illustrate the text.

APPENDIX B

LEARNING STYLES RESOURCES

Barbe, Walter B., and Milone, Michael N., Jr. "What We Know About Modality Strengths." *Educational Leadership* 38 (1981): 378-380.

Barbe, W. B., and Swassing, R. H. *Teaching Through Modality Strengths: Concepts and Practices.* Columbus, OH: Zaner-Bloser, 1979.

Canfield, A. A., and Lafferty, J. C. *Learning Styles Inventory.* Detroit, MI: Humanics Media, 1970.

Cognitive Style Mapping Inventory. Rev. ed. East Lansing, MI: East Lansing High School, 1975.

Davis, Dorothy. *Relational Thinking Styles: Model and Assessment Tool.* Tucson, AZ: Educational Consultations, 1979.

Davis, Dorothy S., and Schwimmer, Phyllis Chiasson. "Style—A Manner of Thinking." *Educational Leadership* 38 (1981): 376-377.

Dunn, Rita, and Carbo, Marie. "Modalities: An Open Letter to Walter Barbe, Michael Milone, and Raymond Swassing." *Educational Leadership* 38 (1981): 381-382.

Dunn, Rita, et al. "Learning Style Researchers Define Differences Differently." *Educational Leadership* 38 (1981): 372-375.

Dunn, Rita, and Dunn, Kenneth. *Learning Style Inventory.* Lawrence, KS: Price Systems, 1975.

Dunn, Rita, and Dunn, Kenneth. *Teaching Students Through Their Individual Learning Styles: A Practical Approach.* Reston, VA: Reston Publishing, 1978.

Dunn, Rita S., and Dunn, Kenneth J. "Learning Styles/Teaching Styles: Should They . . . Can They . . . Be Matched?" *Educational Leadership* 36 (1979): 238-244.

Dunn, Rita, and Dunn, Kenneth. "Questionnaire on Time." Jamaica, NY: St. John's University, School of Education and Human Services, n.d.

Dunn, Rita; Dunn, Kenneth; and Price, Gary E. *Productivity Environmental Preference Survey.* Lawrence, KS: Price Systems, 1977.

Fischer, Barbara Bree, and Fischer, Louis. "Styles in Teaching and Learning." *Educational Leadership* 36 (1979): 245-254.

Frostig, Marianne, et al. *The Marianne Frostig Developmental Test of Visual Perception.* Palo Alto, CA: Consulting Psychologists Press, 1963.

Gregorc, Anthony F. "Learning/Teaching Styles: Their Nature and Effects." In *Student Learning Styles: Diagnosing and Prescribing Programs,* edited by James W. Keefe. Reston, VA: National Association of Secondary School Principals, 1979.

Gregorc, Anthony F. "Learning/Teaching Styles: Potent Forces Behind Them." *Educational Leadership* 36 (1979): 234-236.

Gregorc, Anthony F. *Transaction Ability Inventory.* Storrs, CT: Department of Secondary Education, University of Connecticut, n.d.

Gregorc, A. F., and Ward, H. B. "A New Definition for Individual." *NASSP Bulletin,* February, 1977.

Hagbert, J. O., and Leider, R. J. *The Inventurers: Excursions in Life and Career Renewal.* Reading, MA: Addison-Wesley, 1978.

Hill, Joseph, et al. *Personalized Education Programs Utilizing Cognitive Style Mapping.* Bloomfield Hills, MI: Oakland Community College, 1971.

Hunt, David E. "Learning Style and Student Needs: An Introduction to Conceptual Level." In *Student Learning Styles: Diagnosing and Prescribing Programs,* edited by James W. Keefe. Reston, VA: National Association of Secondary School Principals, 1979.

Jung, Carl. *Psychological Types.* Princeton, NJ: Princeton University Press, 1976.

Kirby, Patricia. *Cognitive Style, Learning Style, and Transfer Skill Acquisition.* Columbus, OH: The National Center for Research in Vocational Education, The Ohio State University, 1979.

Kirk, Samuel. *Illinois Test of Psycholinguistic Abilities.* Urbana: University of Illinois, 1968.

Kolb, David A. *Learning Style Inventory: A Self-Description of Preferred Learning Modes.* Boston: McBer and Co., 1977.

Kolb, David A. "Learning Styles and Disciplinary Differences." In *The Modern American College,* edited by Arthur Chickering and Associates. San Francisco: Jossey-Bass, 1981.

Kolb, David A. *Learning Style Inventory Technical Manual.* Rev. ed. Boston: McBer and Co., 1978.

Kolb, David A.; Rubin, Irwin M.; and McIntyre, James M. *Organizational Psychology: A Book of Readings.* 2d ed. Englewood Cliffs, NJ: Prentice-Hall, 1974.

Lotas, Alexis. *Lotas Teaching Preference Questionnaire.* Southfield, MI: Southfield High School, n.d.

McCarthy, Bernice F. *The 4 Mat System: Teaching to Learning Styles with Right/Left Mode Techniques.* Oakbrook, IL: Excel, 1981.

McClellan, James E., and Komisar, B. Paul. Preface to the American Edition of *Truth and Fallacy in Educational Theory,* by Charles D. Hardie. New York: Bureau of Publications, Teachers College, Columbia University, 1962.

Merrill, David W., and Reed, Roger H. *Style Awareness Text.* Denver: Personnel Predictions and Research, Inc., The Tracom Corporation, 1976.

Practical Applications of Research 3, no. 2 (December 1980): entire issue.

Ramiriz, Manual, and Casteneda, Alfred. *Cultural Democracy, Bicognitive Development and Education.* New York: Academic Press, 1974.

Reckinger, Nancy. "Choice as a Way to Quality Learning." *Educational Leadership* 36 (1979): 255-256.

Renzulli, Joseph, and Smith, Linda H. *Learning Styles Inventory: A Measure of Student Preference for Instructional Techniques.* Mansfield, CT: Creative Learning Press, 1978.

Schmeck, Ronald R., et al. "Development of a Self-Report Inventory for Assessing Individual Differences in Learning Processes." *Applied Psychological Measurement* 1 (1977): 413-431.

Strother, Seldon D. *The Way We Learn: Educational Cognitive Style.* Athens: Ohio University Press, 1975.

APPENDIX C

RESOURCES FOR EDUCATING GIFTED AND TALENTED STUDENTS

Organizations

American Association for Gifted Children
15 Gramercy Park
New York, New York 10003

American Mensa, Ltd.
1701 West Third Street, Suite 1R
Brooklyn, New York 11223

Center for the Study and Education
of the Gifted
Box 170
Teachers College, Columbia University
New York, New York 10027

Council for Exceptional Children
1920 Association Drive
Reston, VA 22091

Creative Education Foundation
State University College at Buffalo
Chase Hall
1300 Elmwood Avenue
Buffalo, New York 14222

The Gifted Child Research Institute
300 West 55th Street
New York, New York 10019

National Association for Creative
Children and Adults
8080 Springvalley Drive
Cincinnati, Ohio 45236

National Association for Gifted Children
2070 County Road
St. Paul, Minnesota 55112

National/State Leadership Training Institute
on the Gifted and Talented
316 West Second Street, Suite PH-C
Los Angeles, California 90012

World Council for Gifted and Talented Children
c/o Milton J. Gold, Executive Secretary
Box 218
Teachers College, Columbia University
New York, New York 10027

Publications

Exceptional Children	Council for Exceptional Children 1920 Association Drive Reston, Virginia 22091
Gifted Child Quarterly	National Association for Gifted Children 217 Gregory Drive Hot Springs, Arkansas 71901
G/C/T	G/C/T Box 55564 Mobile, Alabama 36606
The Creative Child and Adult Quarterly	8080 Springvalley Drive Cincinnati, Ohio 45236
Journal of Creative Behavior	S.U.N.Y. at Buffalo 1300 Elmwood Avenue Buffalo, New York 14222
Journal for the Education of the Gifted	James Alvino Educational Improvement Center Box 209 Sewell, New Jersey 08080
Mensa Bulletin	1701 West Third Street, Suite 1R Brooklyn, New York 11223
Resources for the Gifted	3421 North 44th Street Phoenix, Arizona 85018
Roeper Review	Roeper City and County School 2190 North Woodward Avenue Bloomfield Hills, Michigan 48013

Special Interest Groups

The Gifted Children's Pen Pals International Special Interest Group (SIG)
Mensa Journal International
c/o Dr. Deborah Darby
401 East 65th Street
New York, New York 10021

U.S. Department of Education

Office for Gifted and Talented
400 Maryland Avenue, S.W.
U. S. Department of Education
Washington, DC 20202

Region I: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont

U.S. Department of Education, Region I
2403 John F. Kennedy Federal Building
Government Center
Boston, Massachusetts 02203

Region II: New Jersey, New York, Puerto Rico, Virgin Islands, and the Canal Zone

U.S. Department of Education, Region II
Federal Building
26 Federal Plaza, Room 2954
New York, New York 10278

Region III: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia

U.S. Department of Education, Region III
3535 Market Street, Room 16350
Philadelphia, Pennsylvania 19104

Region IV: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee

U.S. Department of Education, Region IV
101 Marietta Tower Building, Suite 2221
Atlanta, Georgia 30323

Region V: Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin

U.S. Department of Education, Region V
USDE 32nd Floor
300 South Wacker Drive
Chicago, Illinois 60606

Region VI: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas

U.S. Department of Education, Region VI
1200 Main Tower Building, Room 1460
Dallas, Texas 75202

Region VII: Iowa, Kansas, Missouri, and Nebraska

U.S. Department of Education, Region VII
324 East 11th Street, Ninth Floor
Kansas City, Missouri 64106

Region VIII: Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming

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